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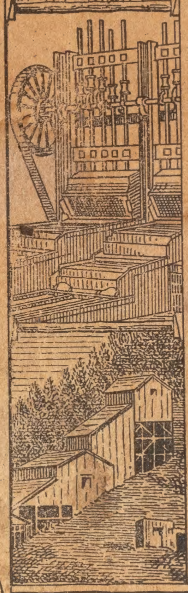

Issued by the Mining
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HON. A. J. CADMAN, MINISTER OF MINES.

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C.H. PIERARD. DEL.

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THE

New Zealand Mines Record.

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NOTES FROM THE MINES.

HAURAKI GOLDFIELDS.

Mining operations in a number of claims are proceeding satisfactorily in the direction of opening up the mines, constructing water-races, and erecting large crushing plants to treat the different kinds of ore found in the Hauraki district. When the crushing mills now in course of erection are completed and commence work, the output of bullion will be considerably increased. The returns of gold for last month are not quite so large as in previous months for the Thames and Coromandel, but in the Ohinemuri district the average yields have been well maintained by the leading mines. Very little work has been done in a large number of outside claims; and as the rent has not been paid in many cases, they have consequently to be forfeited. In Cabbage Bay locality thirty-four men were at work last month in the different claims, but in Kennedy Bay only a few men were employed on the twenty-nine claims and licensed holdings in that locality. The Hauraki Associated Reefs Battery is now completed; and as the company intend to crush for the adjoining mines it will enable the holders to prove their claims in the vicinity of Waikoromiko, and may be the means of discovering something of importance in the surrounding district.

Coromandel.

During the past month there has been an improvement in mining generally in this district. The Kapanga has had a crushing of 60 tons for a yield of 104 oz. of gold, the ore treated being taken from the 300 ft. and 1,000 ft. levels; but as no separate crushing was made, and as the value of the bullion is £2 19s. per ounce, the result indicates that the gold at the 1,000 ft. level is about the same quality.

What is considered an important find has been made in the Poneke No. 2 special claim on the Karaka Block. The reports so far are very satisfactory, and further developments are looked for with considerable interest. The stone is not of the rich specimen class so frequently found in the Coromandel district, but the gold appears to be well distributed, and a very large quantity of backs can be made available at comparatively small cost. The *New Zealand Herald* reporter furnished the following particulars on the 3rd instant:—

The first place visited was the spot where the haul of picked stone was obtained. The foot-wall portion has been worked from the surface outcrop and under the overhanging or main lode, the immense main body of quartz being so far practically untouched. The foot-wall portion is about 3 ft. in thickness, and although several tons of ore have been taken out it has not yet been worked down to the level of the present working-shelf. The foot-wall still carries gold plainly visible in the stone, many pieces being broken down to-day during the visit of the party. Gold is to be seen in all parts of the foot-wall portion of the reef, its strong point being that it carries through the hardest and most compact ore. Although the friable showy stuff is the most catching to the eye, the main reef, now that the foot-wall has been partially removed, stands out in an imposing manner, Mr. Prescott being particularly confident of its proving payable too. A drive has just been initiated below the present workings with a view to at once testing the value of the reef at a lower level. The class of country-rock into which this new drive is entering is of a most kindly-looking description—full of mineral and quartz veins. This drive will not be long in reaching the reef. Some 400 ft. further along the reef has again been exposed to view. Capital prospects have hitherto been obtained by pounding in this locality, but to-day the reef was operated upon, and several pieces of quartz, with the gold plainly visible in the stone, were broken down. Gold is still showing in several places in the reef. A drive is being put in about 20 ft. below the reef at this point. This will afford a further proof of the value of the lode. In several other places along the ridge the lode has been exposed, and in every case the results are most satisfactory. Although gold was not always visible in the stone, yet by pounding good prospects can be relied upon. What struck the visitors most forcibly was the immense size of the main reef, the fine quality of the gold in the stone, and its consistency; also the facilities for working on a most economical and extensive scale. The lode will simply require to be quarried out of what is practically a precipice of about 300 ft. or more in height. It has already been proved beyond a doubt that gold carries along the reef for quite 500 ft.; in fact, well into the New Hauraki Company's property. The crucial point now is, does the gold carry down? This will be proved by the lower levels now being put in at two important points.

The traverse of this new reef goes through the New Hauraki Gold Properties' ground. Gold has been traced close to the boundary, and the company are now prospecting to pick up the run.

Cabbage Bay.

White Star Consolidated.—Sixteen men are employed in driving at different levels on what is termed the No. 3 leader. Some nice specimens were obtained at a place at the intermediate level, on which they sunk a winze 37 ft.; but, although a considerable amount of work has been done by this company, nothing of importance has been met with in any of the leaders running through the claim.

Tapu.

Sheridan.—A considerable amount of work, in the shape of retimbering and cleaning out drives, has been done, and they have only now an opportunity of breaking out quartz after several months' dead work. The low-level cross-cut is being vigorously pushed ahead, and is in a distance of 1,050 ft. Driving and stoping are proceeding on Sheridan's leader, at the upper levels, the prospects met with being very encouraging. The battery commenced crushing on the 22nd instant with ten heads, but they do not intend to clear up till about the end of the year. Thirty-one men are employed.

Mahara Royal.—Driving and stoping on the reef from the main-adit level are proceeding. The reef is a compact body of quartz, and varies from 1 ft. to 6 ft. in thickness. The mine is well opened up, and there is a large quantity of crushing material in sight. The new battery, consisting of ten stamps and six berdans, commenced crushing on the 22nd ultimo by the wet process with amalgamation. The manager states that everything is working satisfactorily, and the quartz that is being put through is shaping on the plates and in the berdans for a good payable return, and it is probable that another ten heads of stamps and a sufficient number of pans and berdans will be put up to treat the tailings, &c., at no distant date. Twenty-nine men are employed.

Waiomo.

Monowai.—Thirty-six men are employed, fifteen men in the Gem section, and twenty-one in the Monowai. The works in progress are mostly of a development character. At the low level the reef has been cut into from the hanging-wall side, but the foot-wall has not been reached yet. The reef here is composed of bunches and ribs of quartz intermixed with the country-rock, and assay tests taken from time to time have given satisfactory results. Tramways have been surveyed, and are now in course of construction, from the Monowai and Gem workings to the battery. The tram-lines will be taken along the spurs on an easy grade for some considerable distance, and from thence incline tramways will be made to the mill, with a view of conveying the quartz at less expense to the battery. The mill is being overhauled, and a change will soon be made from dry- to wet-crushing. After the materials pass through the stamps they will be concentrated, and the first of the concentrates will be sent to Australia for further treatment. The company also purpose bringing in a water-race from the Puru Creek: this is estimated to cost £5,000.

Tararu.

Tararu.—The most important work in hand is the battery low level, which is being pushed on vigorously for the purpose of connecting with the workings from the Tinker's Gully side, or what is termed the Dunedin drive. When this work is done it will enable them to truck the quartz from the workings straight into the battery, instead of having to cart it as they have been doing; but there is yet 800 ft. to drive and 120 ft. to rise before this work is completed. An air-compressor is in course of erection for the purpose of working a rock-drill in the tunnel, by which means the work can be pushed ahead much more expeditiously than by hand labour. A new water-race is being constructed which will give a fall of 95 ft., and sufficient water will be available to drive a forty-stamp battery. The other works in progress are prospecting, driving, and rising to connect with the low level.

City of Auckland.—The principal work in progress is driving a cross-cut from the main-adit level to connect with a shaft which is sunk down to a depth of 70 ft. from the side of the hill. A considerable amount of driving has been done on this company's property on the different reefs, and assay tests taken from the Sylvia and other reefs have given good results.

Kaiser.—Six men are employed in driving a low level for the purpose of intersecting a reef on which a winze has been sunk from a higher level. The reef is 2 ft. in thickness, and contains a fair percentage of the precious metal. The quartz broken out and crushed from the upper drive and winze has given a return of bullion to the value of £6 per ton.

Thames.

Moanataiari.—Development and prospecting works at this company's mine are progressing rapidly, but a great deal of work yet remains to be done to complete the scheme of thoroughly opening up and prospecting the mine which was proposed by the manager some years ago. The main shaft has been sunk to a depth of 500 ft. Considerable difficulty was experienced in sinking through the "main slide," on account of a large stream of water bursting in, carrying clay and gravel with it. This part of the shaft has been strengthened with extra sets of timber, and it is now secure and perfectly safe. No. 4 level has been opened out near the bottom of the shaft, and a drive is being put in in a westerly direction. As the slide is dipping towards the west, it has again been cut through in this drive, and when the latter is extended another 30 ft. the manager intends to put in cross-cut drives to the right and left for the purpose of intersecting Nos. 1 and 2 reefs; then drives will be carried along on the reefs to the Kuranui-Caledonian boundary, which will give ventilation to both mines and allow water to find its way to the Big Pump. No. 3 level has been opened out at a depth of 400 ft., and a drive has been put in a distance of 600 ft. from the shaft to intersect the Waiotahi and Cambria lodes. When the reef is reached, a rise will be put up to connect with the Cambria low level. A large reef has been cut in this drive, but there has not been sufficient development of it to prove its value. A considerable amount of work has also been done at this level on the Caledonian No. 1 reef preparatory to stoping. Development works are also in progress at Nos. 1 and 2 levels; the main tunnel has been extended a distance of 588 ft., and a rise now in course of construction will have to be carried up 210 ft. to connect with the upper levels at a point 600 ft. eastward of the company's workings. Good progress is being made with the erection of the crushing plant and gold-saving appliances, which will be completed towards the end of the year.

Thames-Hauraki.—The Deep Sinker shaft has now attained a depth of 375 ft. About 9 ft. a week is being sunk, and, as there is a good deal of water to contend with, this is very good progress. The country that the shaft is penetrating is not as good as could be desired for gold-bearing reefs, but it is just possible the shaft may be going down in a belt of poor country, and as soon as a level is opened out and driven on for a short distance there is every probability of it changing for the better. The Deep Level Consolidated drive has been driven a distance of 1,180 ft., but so far nothing of importance has been met with. In the main shaft good progress is being made with the chamber at the 327 ft. level for the first sets of cisterns and plunger gear, and the building over the pumping-engine is nearly completed. It has a very imposing appearance, being 71 ft. by 64 ft., with 28 ft. studs, and standing upon a high concrete foundation. The erection of the building over the boilers and coal-shed is being proceeded with. This building is 100 ft. in length, 75 ft. in breadth, with 20 ft. studs. The machinery of the pumping-engine is coming slowly to hand, but no time is being lost in putting it in position as it arrives.

Nonpareil.—The works in progress are sinking a winze below the surface-adit level and stoping on the leader above the level. The leader is about 1 ft. in thickness, and produces a fair quantity of crushing material, yielding from 1½ oz. to 2 oz. of gold to the ton.

Victoria.—This company's operations are confined to the Victoria leader, from which a large quantity of good crushing material has been obtained during the past two years. Stoping is proceeding on this leader over No. 2 level, and a winze is being sunk on it under the level. Sixteen men are employed.

Alburnia.—The principal work in progress is the sinking of the shaft, which has now attained a depth of 615 ft., and preparations are being made for opening out a level from the shaft at a depth of 600 ft. Driving, rising, and stoping are proceeding on Dixon's reef at the Nos. 3, 4, and 5 levels. The reef is about 2 ft. in thickness, and the quartz coming to hand from these levels is of a payable character. Forty-three men are employed.

Alburnia Reefs.—Five men are employed driving on the reef, which varies in thickness from 6 in. to 6 ft. A little gold has been seen in the quartz, and the manager is hopeful that something of importance may be met with at any time.

Hauraki Golden Age.—The operations in this company's mine are principally confined to opening up the Waiotahi and Golden Age reefs. The Australasian level is in a distance of 1,200 ft. on the course of the reef. At the junction of two reefs there is a body of quartz from 30 ft. to 50 ft. in thickness. A large amount of work is also being done on the same reefs in the lower levels, and gold is frequently seen in the quartz as it is broken out. The erection of the new forty-stamp battery, with two ore-crushers and other appliances, is nearly completed; and a coupled compound condensing-engine, with high-pressure cylinder 18 in., and low-pressure 29½ in., in diameter, and 32 in. stroke, which will be supplied with steam from two Lancashire boilers, 6 ft. 9 in. in diameter by 28 ft. in length, is also in course of erection for driving the mill when water is not available. Hoppers and an aërial tramway are being constructed to convey the quartz from the mine to the battery, and when it is all completed it will be an excellent plant, capable of treating 50 tons of ore every twenty-four hours.

Hauraki-Fortuna.—This company have thirty-one men employed. The principal work is rising from the Gibraltar level and sinking a winze from the surface-level to meet the rise that is being put up from the Gibraltar level. When this connection is made it will give good ventilation to this part of the mine, and afford every facility for working the reef, which is 12 ft. in width in places. The quartz that has been tested from time to time gave results of a payable nature. The assay-house and plant, office, blacksmith's shop, changing-house, &c., are nearly completed, and everything will soon be in readiness to work the mine in a systematic manner.

Karangahake.

New Zealand Crown Mines.—The different works in and outside of the mine are being pushed ahead. No. 4 level is in a distance of 1,960 ft., and is still being extended in a southern direction on the reef, and stoping operations are also proceeding over this level. In No. 6 level, which is in a distance of 1,860 ft., fifty-two men are employed in driving, rising, and stoping. The reef, which is 8 ft. in width, is broken out from wall to wall, and sent to the mill for treatment. At one place in the level underhand stoping has been carried along the bottom of the level for a distance of 80 ft. and to a depth of 50 ft. The reef is 14 ft. wide in the lower workings, and is stated to be worth £5 per ton. One hundred and fifty-two men are employed at the mine, exclusive of those engaged at the battery and cyanide plant.

New Zealand Talisman.—Operations at this company's mine are being vigorously carried on. Men are engaged in driving south on the Nos. 5 and 6 levels, and stoping is proceeding at Nos. 3, 4, and 5 levels. The reef varies from 3 ft. to 8 ft. in thickness, and as the mine is well opened up an abundance of quartz is being obtained to keep the battery fully employed.

Woodstock.—In the No. 5 level rich stone, heavily charged with coarse gold, has been lately broken down, and is being bagged for future treatment, as the present plant is incapable of treating refractory ore of the class met with in this level. The vein carrying the gold is about 6 in. in thickness, while the lode is about 3 ft. in width. One ton of this ore yielded bullion valued at £126. Preparations are going on at the battery to put five heads on to wet-crushing with cyanide, in order to find out whether that mode of treatment can be profitably adapted to the ores found in this mine.

Imperial.—Nine men are at work driving a low level in the United section. The reef, which has been driven on at this level for a distance of 280 ft., is 3 ft. in width, and of a promising character, some of the assay-tests being very satisfactory. There is a compact body of quartz, and gold is often seen in breaking it out. The top level has been driven a distance of 70 ft. on the reef, and the quality of the stone is similar to that in the low level. There is 130 ft. of backs between the two levels, and from the top level to the surface there is a considerable extent.

Waihi.

Waihi.—The usual monthly average of bullion is well sustained; 3,240 tons of ore yielded 10,927 oz. of bullion, valued at £11,640. This company's record of bullion from 1890 to 16th October, 1897, has now attained to the respectable total of £607,107 5s., and of that amount there was paid away in a few years to the shareholders no less than £228,500 in dividends. In the western section of the property the Victoria lode, which in some places attains a width of 20 ft., is being operated upon, and they are cross-cutting to secure the Welcome lode.

Waihi-Silverton.—Driving is proceeding north and south on the reef at No. 2 level, and stoping operations are in progress from this level upwards. The reef is 13 ft. thick, and sufficient quartz is being obtained to keep the mill fully employed. The shaft is being sunk for another level, and is now down a depth of 60 ft. below No. 2 level. The manager intends to open out when it reaches a depth of 80 ft. One hundred men are employed in the mine and battery.

Waihi-Monument.—A shaft has been sunk on this company's mine to a depth of 175 ft. A drive is being put in from the bottom of the shaft to intersect the reef, and the manager expects to cut it within 50 ft. of the present face of the drive.

Waitekauri.

Waitekauri Extended.—This company's mine is being opened up in a very systematic manner. The reef has been driven and sunk on at different places, and found to be from 18 ft. to 28 ft. in thickness, and various assay-tests are reported as high as £9 and as low as 3s. 6d. to the ton. The estimated quantity of ore broken out and stacked on the surface at the different levels is 4,000 tons. The erection of a forty-stamp mill is being pushed on with all possible speed, and the water-race and tramways are nearly completed. Ninety-one men are employed on the various works in the company's property.

Waitekauri Cross.—This company are driving on the hanging-wall portion of the reef, and putting cross-cuts through it every 50 ft. to ascertain its thickness and value. A shaft has been sunk to a depth of 88 ft., and a drive has been started from the bottom of it for the purpose of proving the value of the reef at this level, and a cross-cut is being driven westward to prospect the mine in this direction. The reef varies from 14 ft. to 58 ft. in thickness, but the tests taken from it have not so far proved of a payable character. Thirty-seven men are employed in the mine.

Waitekauri United.—The principal works going on in this mine are putting in prospecting drives. The low level is in a distance of 1,080 ft. A reef was cut through 140 ft. back from the face of the drive which is now being driven upon. The reef is 8 ft. thick, and assay-tests taken from it gave 8s. worth of bullion to the ton. As rich ore was taken from the Welcome reef on the surface, it is expected that the levels now being put in may result in something of importance being discovered. Fifty-one men are employed.

Waitekauri Consols.—Six men have been employed in driving a cross-cut to intersect the Waitekauri Extended reef, which has been cut through on the outcrop, the assay-tests from it being at the rate of 9s. to £1 6s. to the ton.

Komata.

Komata Reefs.—This company have completed the erection of their twenty-stamp mill and cyanide plant, and everything appears to be working smoothly. Six men are engaged in timbering-up on Argall's reef at a point where a rise is to be put up to an intermediate level. This rise is for the purpose of sending the quartz down from the upper levels, and will also complete connection with the aërial tramway to the mill. Stoping operations are proceeding above the intermediate level. The reef is 10 ft. wide here, and no trouble is anticipated in getting plenty of quartz to keep the battery going. A rise is being put up on Hartridge's reef from the intermediate to the surface-level; there is a large block of ground opened up on this reef, and tests taken from it have given encouraging results. Fifty-seven men are employed at the mine and battery.

Komata Queen.—Sixteen men are employed driving on the different lodes. A cross-cut is being put in to intersect the Argall lode.

Te-Ao-Marama.—Twenty-nine men are employed on this company's property. At the low level sixteen men are engaged in driving on the reef, which is 7 ft. in thickness, and rising on it. They are also rising on the Te-Ao-Marama reef to connect with the surface-level for ventilation, and putting in cross-cut drives east and west to prospect the country. The main low level is in between 800 ft. and 900 ft.

Te Aroha.

Te Aroha.—The different works in this company's mine are being vigorously pushed ahead, forty-five men being employed. Thirteen men were formerly at work in the low level, but since the engine and air-compressor were put on the ground most of the work has been done with rock-borers, enabling this important work to be pushed ahead more speedily. A drive is being put in on the Silver King lode, and another drive on the course of the lode from a cross-cut put in from the Colonist Creek.

Great Western.—Nine men are employed in the mine, and twenty-five men on outside work—cutting out a place for a battery, erecting hoppers, and making preparations for the construction of an aërial tramway. The reef, which varies from 2 ft. to 12 ft. in thickness, is what was formerly known as the No. 2 New Find, Waiorongomai. The assay-tests taken from time to time from the reef have given the directors sufficient encouragement to erect a battery for the reduction of the ore.

NELSON-WESTLAND GOLDFIELDS.

Fairdown.

Three shifts are at work on the General Exploration Company's sluicing claim at Fairdown, and thirty men are employed. They have not yet reached the gold-bearing drift.

Addison's Flat.

Bendigo Claim.—Since last report an entire suspension of the progressive works undertaken by the General Exploration Company has taken place, pending the report of an expert. At present fifty men are employed sinking shafts on the claim.

Charleston.

M. Twohill and party (four), who own the Dublin City Cement Claim, the area of which is 13½ acres, are working on a face averaging from 7 ft. to 9 ft. in thickness. The claim is connected with the battery by a ground tramway 36 chains in length. The battery consists of eight stampers, 350 lb. each, driven by an overshot water-wheel 30 ft. in diameter by 3 ft. breast, and crushes 16 yards per day of nine hours.

The Morning Star Cement Claim, owned by Messrs. Wilkie, Connelly, and Dwyer, comprises an area of 9 acres. There are four heads of stampers 400 lb. each, driven by an overshot water-wheel 35 ft. in diameter and 2 ft. 6 in. breast, capable of crushing sixteen loads per day of nine hours. The working-face at this claim is between 40 ft. and 50 ft. above the battery, and averages 1½ dwt. to 2 dwt. to the load. The face is connected with a long shoot, 50 ft. in height, by a tramway 3 chains in length, over which the cement is discharged to the battery.

The Enterprise Cement Claim, consisting of 9 acres, is owned by T. Norris and party (four). A four-head battery, 500 lb. each, is driven by a water-wheel 30 ft. by 2 ft. 6 in. The cement at this claim is soft, and lying in layers, with white sand between them. About 4 ft. of this cement was washed off in former days, leaving between 3 ft. and 4 ft. for the present party to work forward. The old face will be reached in a few weeks, when better results are expected. The party have had only one washing-up, and obtained gold to the value of £30 from 240 loads, being at the rate of 2s. 6d. per load. About 10 cubic yards are crushed in a day of nine hours. The gold from these cement claims fetches £3 19s. per ounce.

A lignite-bed which is worked in this locality is a great boon to the residents. About 10 ft. of the seam is taken and filled into the drays at the face. It makes a good fuel for domestic purposes.

Lyell.

Alpine United.—A connection has been effected between Nos. 9 and 10 levels. The reef is 3 ft. wide, thickening to 4 ft. at north end. Thirty-five men are at work, and the battery is kept fully employed.

Tyrconnel.—This mine is situated at an altitude of 2,000 ft. above sea-level. It is eight miles north-west of Lyell; area, 23 acres; average number of men employed, five. The low-level cross-cut is in 800 ft., the shoot of stone being 300 ft. in length, and the rise from the low level to the intermediate is 150 ft., the block being 340 ft. in height. The No. 3 level has been driven a distance of 749 ft. The leader is very flat—about 1 ft. in 1 ft.

Crushington.

Keep-it-Dark.—The reef in No. 7 level, which has been driven on for a distance of 90 ft., is, in some places, hard and solid, but a large portion is a mixture of mullock and quartz. So far, on this level, the reef is very irregular and of low grade. In the stopes above No. 5 level the stone still continues poor, but there are indications of an improvement taking place.

No. 2 South Keep-it-Dark.—The contractors for driving west on No. 3 level have completed their contract for 100 ft., and have commenced a second contract for a similar distance; they are now in 114 ft.

Hercules.—During the past month the company have been driving on a leader which was struck in the east cross-cut; they have driven 30 ft. south, and 16 ft. north. The south drive is still carrying the leader of quartz, which keeps about the same as when started on; but in the north end the walls are coming together, leaving the track small and hard. Tenders have been called for extending No. 9 level north on reef track a distance of 100 ft.

Boatman's.

Welcome.—The reef in No. 3 level is 2 ft. 6 in. wide, and shows gold freely. The level is driven in virgin ground, and there will be about 350 ft. of backs available. The mine is situated a mile and a half north of Capleston, and the No. 3 level is driven about 700 ft. above the township.

Merrijigs.

Cumberland Extended.—Since the amalgamation of the Cumberland, Exchange, and Success properties (under the title of the "Cumberland Extended") the following work has been done: The pass from the Cumberland No. 2 level to No. 2 intermediate has been repaired, and some slight repairs effected in No. 1 intermediate and No. 1 levels. There is now a fair travelling-road and thorough ventilation from No. 2 level by way of upper workings to the surface. The incline and also a portion of No. 3 level have been repaired. The manager reported on 23rd October that he had started to drive in a north-westerly direction on the course of the lode, and on the 30th he reported having extended No. 3 level 11 ft. for the week. There was not quite so much stone in the face as at previous report. He had got the hanging-wall, and recommended a cross-cut to be driven across the reef towards the foot-wall to ascertain the value. A bore-hole was put into the Exchange winze and most of the water let out. A small drive will have to be put into it at an early date for ventilation purposes.

Inkerman Combined Mines.—From the 28th August to the 30th October 1,454 ft. of driving has been done in the mine, consisting of 1,175 ft. in opening new ground and 279 ft. reopening old ground. The rock-drills working at Rainy Creek have made fair progress, a little over 45 ft. per week having been driven during September.

Sir Francis Drake.—No. 1 level has been extended 40 ft. north for the month. Work has been discontinued on this level pending completion of uprise, which is now up to 60 ft. from floor of drive on a strong body of stone; another 20 ft. will connect with the surface, when stoping out on this block will be started. On No. 2 level, 10 ft. has been driven on a favourable reef track, indications pointing to the near proximity of a block of stone, the workings being well under the strike of stone in No. 1 level. The new find in the Gallant section of the mine has been driven on 33 ft., with stone still showing in the face. The same block of stone has also been cut 60 ft. further south on the surface. Twenty-six tons of quartz have been sent from this reef to the receiving-paddock, and this, with the addition of what may be broken out during the week, will be put through the mill as a trial crushing.

* * *

OTAGO GOLDFIELDS.

Macetown.

Premier Mine.—This mine, which belongs to the Glenrock Consolidated (Limited), is entered by an adit-level about 1,500 ft. long. The method of working is by overhead stopes. The reef, which has a variable width up to 6 ft., is followed on a grade of 1 in 4 by an incline, the trucks being hauled up the incline by winding-gear actuated by an electric motor. The walls enclosing the reef appear to have a varying angle, the average being probably 50° from the horizontal. The stone looks well throughout the mine. The roadings and working-places are well timbered, and the mine is admirably ventilated. The battery has twenty heads of stamps, driven by a 6 ft. Pelton wheel. A dynamo also obtains its power from the same source, and generates the current which works the hauling-motor at the mine. A 4-ton cyanide plant is attached to the battery. There are thirty-four hands employed.

Westralia and New Zealand Gold Explorers.—The adit-tunnel into this mine (the Tipperary) is 1,960 ft. long, and the drive extends 300 ft. on the reef from the end of the tunnel. The reef varies in width from 5 ft. to 6 in. near the face of the drive. A vertical shaft is being sunk to prove the reef at a lower level. Boring operations are also in hand at a level about 150 ft. above the adit. Ventilation is produced by a water-blast, and the air led into the mine in pipes. Although there is only one means of entrance into and egress from the mine, the air is quite sweet. Fourteen hands are employed.

Skipper's.

Phœnix Mine, Bullendale.—This mine, which is owned by the Achilles Goldfields (Limited), was formerly the property of Mr. Bullen, and has been working for upwards of thirty years. At present it is the only quartz-mine at work in the locality. For some time past a considerable amount of development has been in progress, with a view to increasing the efficiency of the mine and reducing the working-expenses. This has mainly consisted in the sinking of a new incline shaft to a low level at an angle of about 54° from the horizontal, but for a short distance near the bottom the gradient is about 60°. Double lines of rails are laid, and a very satisfactory stairway is provided instead of ladders: this is fenced off from the haulage way. The hauling-power will be water at a high pressure working a Pelton wheel, connected by gearing to the winding-drums. The new works (which include race-cutting, pipe-line, stone foundations for hauling plant, buildings, &c.) are fast approaching completion, and will effect considerable saving in working-expenses. All the stone will be raised up the new shaft from the several working-levels. The present winding-shaft and winzes, now worked by compressed-air engines, will be dispensed with, except for ventilation purposes and as a means of egress from the mine in cases of emergency. Mr. Evans, the managing director, states that the whole of this work has been paid for out of the ordinary earnings of the mine without calling up fresh capital—*i.e.*, what might have been paid as dividends has gone to develop the mine. Underground, the workings are principally in Nos. 4 and 5 levels, but prospecting work is going on in No. 6 level: the ventilation is excellent. The battery has thirty heads of stamps capable of crushing 50 tons of quartz in twenty-four hours. The tables are simple in construction, but as a proof of their efficiency Mr. Evans states that, although tested by repeated assays, nothing of commercial value can be recovered from the tailings. There is a quantity of concentrates on hand awaiting treatment; these are impregnated with pyrites to some extent. There are over a hundred men employed by the company, including twenty-four men engaged on new development work underground and eleven men at the surface; but when the new works are finished, about sixty hands will suffice for the mine and battery.

Cardrona.

This alluvial goldfield, looked at from a digger's standpoint, is thought to be pretty well worked out, but it would probably be worth looking into as a field for dredging operations. There are a few small claims working about the township. These, for the most part, are on ground that has been gone over previously, yet in most cases good wages are made during the eight or nine months in each year in which work can be prosecuted. Owing to the snow, operations are suspended during the winter months. A nugget of about 6 dwt. has been recently found on the hills close to the township. The claim nearly opposite the Cardrona Hotel yields some nice rough gold, although the ground has been driven in at some previous period. It is worked by a party of tributers who mine the wash-dirt and truck it out to the mine-mouth. They state their returns are very satisfactory. The water from the claim is raised by hydraulic elevator.

Cromwell.

A partial flood in the Kawarau and Clutha Rivers caused a suspension of dredging operations for a time on those rivers. Though the dredging returns are not made public, it is currently reported that during the past four months the weekly yields from the Electric Dredge No. 1 have varied from 35 oz. up to 150 oz., and only on one occasion was the weekly return as low as 35 oz.

Bannockburn.

A company to take over all the mining property at Bannockburn is talked of.

A claim of 50 acres on Richards' Beach, near the Kawarau River, has been pegged off by Messrs. Parsons and Sutherland, who propose to drive a tunnel to prospect the ground, and if payable to work it by dredging.

Mr. J. O. Matthews is surveying a race with the view of bringing in fifty heads of water from the Nevis side of the Carrick Range to Bannockburn.

Naseby.

Nothing of very great importance, viewed from a mining standpoint, has eventuated in this district during the past month. It may, perhaps, be worthy of note that the rainfall has been most exceptional, and probably phenomenal, for this part of the colony. As a rseult, water for mining purposes has been plentiful, the Government Race, so far as its carrying-capacity is concerned, having been tested to the utmost, and running full all the time.

Boring and sinking operations are now in progress in connection with the proposed new reservoir on the West Eweburn Creek. The object is to test the practicability of building an extensive reservoir in connection with the Government Race to store and conserve the surplus flood-water now running to waste. This is a work which, if undertaken, the mining population consider will give a very great impetus to gold-mining in this district.

The Ophir and Ind Dredge has been dismantled, and the bulk of the machinery is now on the claim at the Kyeburn. Guffie and Co.'s dredge is being built; and tenders have been called for the removal of the small dredge now on the Fillyburn to the Kyeburn.

Alexandra

The Lion Rock Dredge has been successfully floated at the Manuherikia. This makes the sixteenth dredge now operating within four miles of Alexandra, the weekly returns from which are variously stated at from 500 oz. to 800 oz. Before the winter sets in there will be upwards of twenty dredges at work in the district.

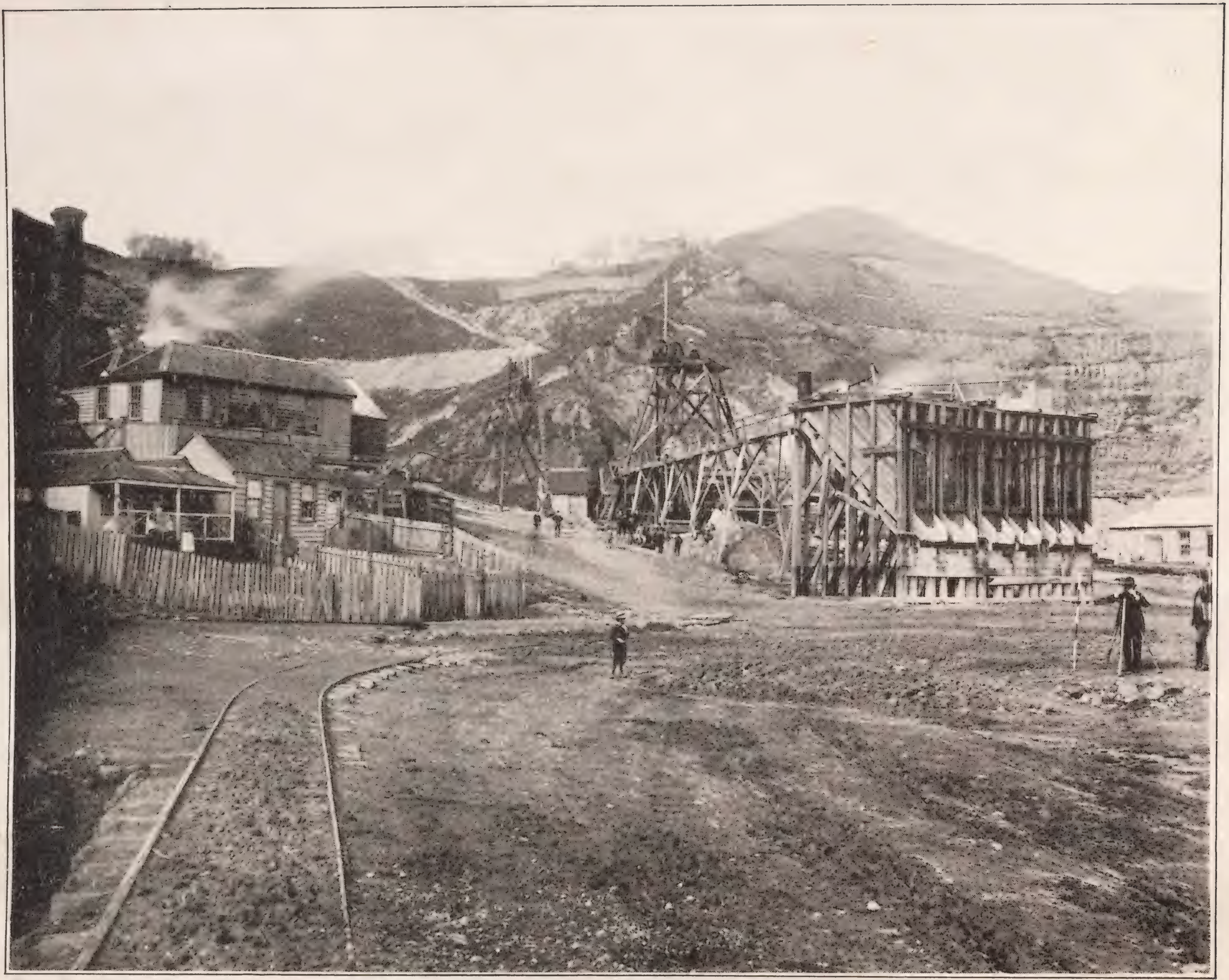
Roxburgh.

Roxburgh Amalgamated.—The Roxburgh Amalgamated Mining and Sluicing Company's claim is situated on the eastern side of the Clutha River, opposite the Town of Roxburgh, but practically on the site where the township formerly stood. The system of work is by hydraulic sluicing and elevating. The wash-dirt is, approximately, 40 ft. thick, overlaid by 20 ft. to 25 ft. of stripping, principally of a loose, sandy character. The auriferous wash is very free working, and does not contain many very large stones. The bed-rock is mica-schist rock, with veins of quartz, and in some instances has been worn into gutters, which are filled with wash-dirt. The gold is flakey as a rule; its value is £3 17s. per oz. Two sluicing-nozzles and two elevators are usually kept going, a third one being in readiness so as to be put to work while the boxes of either of the other elevators are being washed up; a fourth elevator is used for drainage purposes only. The company's reservoir (locally known as "Lake Onslow") is about twenty-three miles from the claim, and covers an area of 1,500 acres, by an average depth of 10 ft. It is maintained as an auxiliary to the Teviot Stream, into which its water can be turned, and from which the company takes its supply for the works by a flume, constructed of timber, 3 ft. wide and 2 ft. deep, with a fall of 10 in. per chain. This flume is about two miles long from the Teviot Stream to the penstock; the latter is 550 ft. above the bottom of the claim. The main pipe-line is from 22 in. to 15 in. diameter, and 66 chains in length; branch pipe-lines, from 11 in. to 7 in. diameter; nozzle- and elevator-jets, 3 in. diameter. The elevator sluice-boxes have an average length of 100 ft., with a fall of 8 in. in 12 ft. for the first 30 ft., and 5 in. in 12 ft. for the remainder. Iron riffles are provided, underlaid by matting. During the past few months the returns have not been large enough to pay dividends, but from the last cleaning-up it appears a better run of ground has been come upon. Twenty-five men are employed; and the works are lit up by electricity. Mr. W. Peters, who has managed the claim for the past few years, has just removed to Collingwood, where he has accepted a more lucrative appointment. His successor is Mr. J. H. Waigth.

WAIHI GOLD-MINING COMPANY, LIMITED.

An extraordinary general meeting of the Waihi Gold-mining Company (Limited) was held on the 9th September at the Cannon Street Hotel, E.C., London, Mr. Thomas Russell, C.M.G., presiding, for the purpose of submitting resolutions to increase the capital of the company. The Secretary (Mr. Hubert Akers) having read the notice convening the meeting,—

The Chairman said: Gentlemen, - It is with pleasure we meet you to-day. We are about to take an important step forward, and place another landmark in our history—to increase the capital of the company from £160,000 to £320,000. I propose to refer briefly to the history of our capital account, in order to show what excellent work has been done with it, that it is necessary now to provide more money, and how completely justified we are in doing so. The properties we have been working upon at Waihi had been previously worked by others, some parts for more than ten years. There was no question about the ore containing gold—that was well known—but much of the gold was very fine, and in the process of wet crushing, then the only process known in New Zealand, this fine gold could not be saved, much of it being carried away by the water. The ore was crushed at the mills at the Thames and at a small mill owned by the shareholders of the Martha Mine, but it did not pay the cost of mining and milling. The saving of gold under this system was probably not more than 30 per cent. of the gold contents of the ore, and the previous owners must have lost money by their operations. This was the problem we had to solve. This company was incorporated in 1887 with a capital of £100,000, of which £25,000 was set aside as working capital—a large sum in those times—but a sum which was soon found to be quite insufficient. After much inquiry and many experimental trials it was decided to crush the ore dry. Our first dry crushing plant was a failure, and we had to return to the use of stamps, from which system we have not since departed. We put up a first-class mill with twenty heavy stamps, superior to any mill that had previously been in use in New Zealand. As we gained experience, and increased our milling power, we have increased the weight of our stamps and the speed of the strokes. Our good mill, the dry crushing, and careful amalgamation with mercury in Howell pans gave us better results; the extraction was very much increased. True, the loss of mercury was very great, but by careful manipulation we began to see that we might pay small dividends. While these experiments were proceeding, and before success was assured, we saw that profitable results could not be got from a small mill, and it became necessary to raise further capital. It was impossible to raise it by the issue of shares, for the £1 shares had fallen in value; sales were made of them as low as 2s. 6d. each, and 5s. for some time was a good price. An issue of shares being hopeless, the directors, in the year 1889, raised the necessary money by debentures, to the extent of £20,000. These debentures were taken mainly by the directors and their friends. The money obtained by this means tided the company over its difficulties, and the capital was subsequently increased to £150,000 for the purpose of paying off the debentures and providing shares and cash to complete the purchase of the Martha property, and to extend the milling plant. In addition to the capital thus provided, the shareholders had for many years patiently allowed the profits of the mine to be used on capital account. Extensive water-races were made, increased milling power was provided, and a great deal of mining work was done by money obtained from the profits accruing from the crushing operations. In 1895, when greater confidence had come from explorations in the mine, a further important step was taken. We raised the sum of £50,000 by the issue and sale to the shareholders of 10,000 shares at £5 each. This increased the capital to £160,000. This money enabled us to undertake more thorough exploration and to open up the mine very largely, much in advance of ordinary milling requirements, and to provide pumps for sinking to a great depth. Every advance we made in development and exploration of the mine in depth and throughout from east to west brought us such further knowledge as to induce us to push our investigations still further and further, with the most assuring and satisfactory—indeed, I may say, with very remarkable—results. The knowledge thus gained of the great resources of the property induced us to proceed to build the Victoria Mill. I would remind you that we have a great water-power at the new mill; certainly for nine months in the year we shall have power enough for 200 or even 300 head of stamps, perhaps more. During part of a dry summer we may require steam power after we increase the plant beyond the first 100 head. The present works are designed for a mill of 200 head; the turbine, Pelton wheels, and buildings are all arranged for 200 head of stamps, and the second 100 head of stamps can be added very quickly and without much expense. This we shall do as soon as the Union–Waihi require the 90 head we have now in use at the mine, or possibly before that time. The Victoria Mill is connected with the mine by a first-class tramway, laid with steel rails and worked by steam locomotives. All the work about our property in every part is solid and substantial, and in keeping with the great mine we are working. We have spent a considerable sum of money, much more than we thought of at first, but not more than is profitable and desirable in your interests. We have been led on in this expenditure by the remarkable results which we have obtained in the mine as we have proceeded with our explorations, and even more so now in the recent works at the eastern end of the mine. In our opinion the remarkable results recorded at the annual meeting justify the resolutions we are submitting to-day. Nothing of importance has occurred to alter the general position since then, but you will remember we were at that time in the midst of important works upon the lodes in both levels recently discovered in the eastern section of the mine. Most of the information we then had was obtained by telegrams from the colony, which, though necessarily brief, gave pretty clear views of the actual position. More detailed reports have since reached us, and further cables also, the latest bringing the information up to the 26th August last. You will note that in the eastern end, as in other parts of the mine, the lode has increased in size between the No. 1 and No. 2 levels, and in the No. 2 it is of great size and richness. The shareholders of this company deserve success. With great courage they risked their money in this enterprise when the outlook was not bright and the surrounding conditions were trying and adverse. They waited long and patiently for results. Those results have now come within our reach, and the further and important step we ask you to take to-day is a safe and profitable one, and, with the greatest confidence in the results, we recommend it to your acceptance. When we suggested a debenture issue of £100,000, it was intended to meet by it the present requirements of the company only; we knew it left unadjusted a large amount of share capital contributed by shareholders and from profits used, amounting in all to about £120,000. This we could have adjusted later on, and if the shareholders generally had agreed to take their proportion of the debenture issue we should have pressed it; but when even a minority of the shareholders objected to a debt, the directors would not take the responsibility of pressing a large debenture proposal. (Hear, hear.) Moreover, the proposed issue of debentures, while it would have provided sufficient money for present needs, would not have given us enough for those further works which it is more evident than ever must still be undertaken before the whole of our mining area is made profitable, and comes well into hand. We require another shaft at the western end of the mine, and the recent discoveries at the eastern end will probably require a shaft there also, and though we may not require more pumps, these shafts will have to be equipped with winding machinery. Then the main shaft has to be sunk deeper, and lower levels opened up, and this will require a considerable amount of money on capital account. Moreover, we now have always about £30,000 in value of gold in transit on the water, and when the new mill starts we shall have double that amount afloat; it will require £60,000 at least to carry that gold until it is available in London. We believe that the increased amount to be raised by the present proposals is none too much for the requirements of the company. When we came to consider all the questions involved in the issue of the new shares—as to the number we should issue—we had to bear in mind that a very considerable number of shareholders desired to split the shares—that is, to make the £160,000 of capital into 320,000 shares of 10s. each. While we were somewhat in sympathy with this desire, we felt an objection to reducing the capital value of the shares from £1 to 10s. We also think this large issue of shares is a better plan, inasmuch as it will enable every shareholder, however small, to retain exactly, without diminution, the interest which he has at present in the mine. A smaller issue of shares would not have given these results and met these requirements, and so we think the resolutions which we now propose for your adoption to-day the best suited to



From Photo. by Foy, Bros.

No. 1. Old Queen of Beauty Shaft in 1885.

meet all the circumstances of our case. The Chairman then moved the following resolutions:—

1. That the capital of the company be increased to £320,000 by the creation of 160,000 new shares of £1 each. 2. That after 1st June, 1898, such new shares shall rank *pari passu* with the existing capital of the company for all purposes, and accordingly shall be entitled to participate in all future dividends declared after that date; in the meantime interest at the rate of 5 per cent. per annum shall be paid on the amounts of the instalments from the dates they become due, provided they are paid on or before such date. 3. That such shares shall be issued at par, and generally upon such terms and conditions as the directors may determine: Provided that in the first instance the same shall be offered for subscription to the holders of the existing shares in the proportion of one new share for every existing share: Provided further, that all new shares not taken up by the existing shareholders as aforesaid shall be at the absolute disposal of the directors, who may allot and dispose of the same to such persons and at such price, and generally upon such terms and conditions as they may think fit.

The Chairman said that to make the second resolution clearer, it was proposed to add thereto the words, "And such interest shall be reckoned up to the 31st May, 1898." The dividend on the new shares would thus accrue from the 1st June onward, and dividends would henceforth be paid on the 1st June, September, December, and March, instead of on the 10th.

Mr. H. J. Bristow seconded the resolutions, and the suggested amendment was at once proposed by Mr. A. M. Mitchison, and seconded by Mr. J. Boustead.

After some remarks from Mr. Rothwell in support of the Board's proposition, the Chairman, replying to questions, said the company had already spent upon the new mill and works connected with it £60,000; upon the other mill, new engines, new plant, &c., £15,000; and upon No. 2 shaft, including a large pump, and gear, &c., capable of sinking to 1,000 ft., £20,000. They would want another £20,000 to complete the mill. This accounted for £115,000 out of the £160,000 proposed to be raised. Besides the £45,000 left, they had an available reserve of £18,000, and a revenue balance of £22,000, so that they would have total available funds for future operations of £85,000. (Applause.) The new mill would probably be ready for working in January next. It was a fact that a large reef had been found on the property adjoining the Waihi on the east, and if that proved to be the same reef as they (the Waihi) were now working, it must exist between the two points, and as they had about 800 ft. of ground between their eastern works and the boundary, it would doubtless be necessary to make provision for sinking another shaft further east than their No. 1 shaft.

The resolutions, as amended, were adopted unanimously, and a vote of thanks to the chairman and directors closed the meeting.

DEEP-SINKING AT THE THAMES.

THE question of further prospecting the Thames Goldfield at deep levels exercised the attention of mining men for many years, but the local companies, having paid away all the gold won in working expenses or dividends, were unable to cope with the problem. In a "Report on the Geology, Resources, and Future Prospects of the Thames Goldfields," prepared about four years ago by Mr. James Park, F.G.S., who was then Director of the School of Mines, the following introductory and concluding paragraphs occurred:—

> Although twenty-seven years have elapsed since the discovery of gold at the Thames the greater part of the mining operations of this productive goldfield have been confined to an area not much over a square mile in extent. The natural result of this activity, extending over so long a period and in such a limited area, has been to exhaust most of the more accessible and readily obtainable gold, and it is now evident to every one that the question of deep sinking and the development of the back-country must claim the attention and serious consideration of our mining men if the Thames is to maintain for long its position as the leading reefing district in New Zealand.
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> From a long personal acquaintance with the character and peculiarities of the gold-bearing country and the reefs of the Thames Goldfields, I am convinced that when her main lodes and low levels are fully developed she will enter on a second lease of life, more prosperous, although perhaps less exciting, and infinitely more enduring than the first. In Hungary reefs of a similar character, and in the same class of country, have been profitably worked for over eight hundred years, and this fact, I think, augurs well for the future prospects of this goldfield.

Mr. H. A. Gordon, F.G.S., &c., late Inspecting Engineer, drew attention to the same subject on several occasions. In his report for 1893–94 he stated:—

> As year by year passes by the workings in the mines are getting deeper, and consequently more expensive to work. The heavy charge for drainage, with the yields from the mines falling off, is becoming a drag on the shareholders, and it appears to any one visiting the field that the day is not far distant when several of the companies will have to suspend operations. The great cry in the district is, "Test the deep levels"; but to do this requires more capital than the present companies can find. And, in addition to this, there has not yet been a

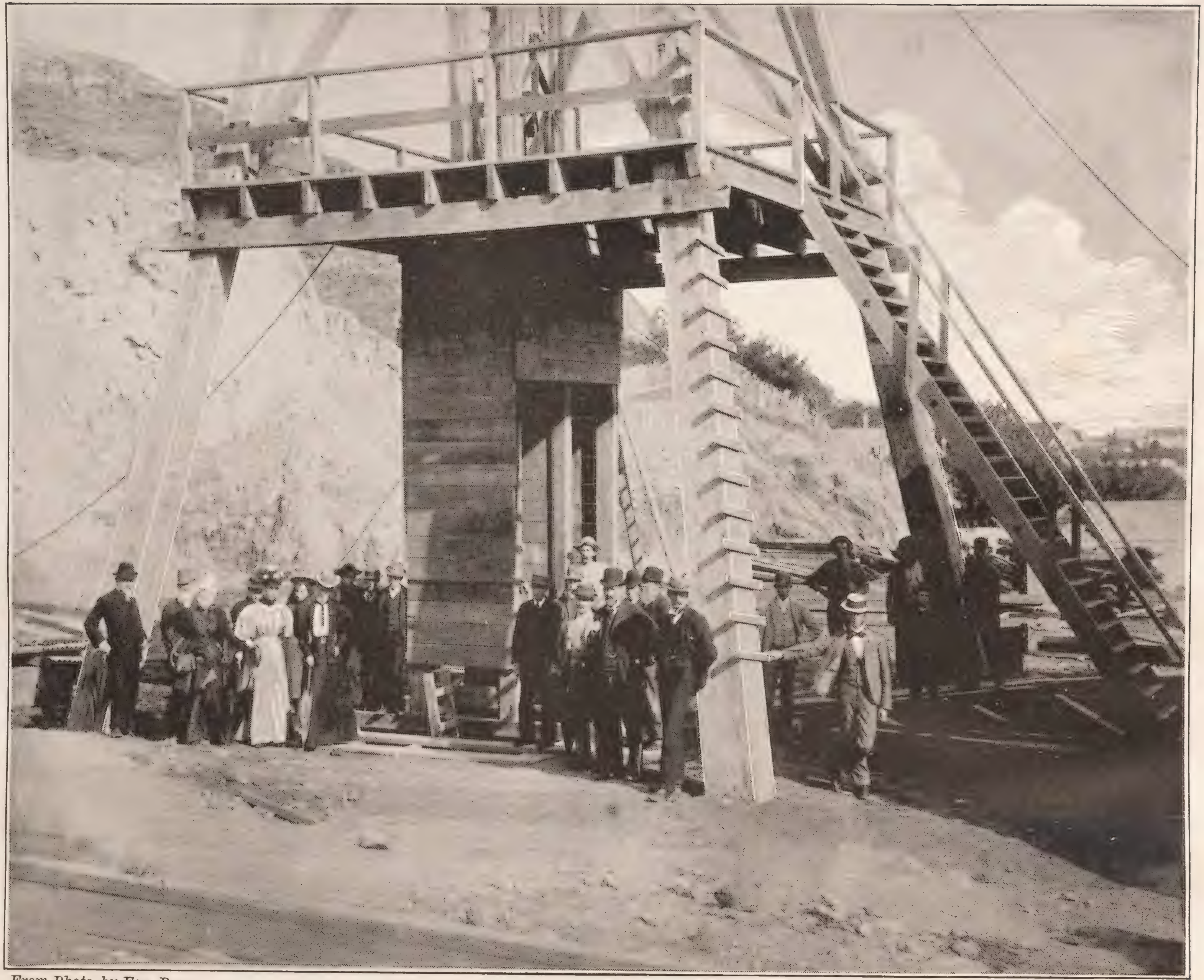
feasible scheme put forward to give sufficient encouragement to capitalists to invest money to prospect the deep levels. The ground on this field was extremely rich in some portions of the lodes, especially near the outcrops at the northern end of the field. At the Kuranui Hill the most of the gold was got close to the surface, and it appears to trend in a southerly direction from where it was found on the Shotover Claim, in a belt of ground having several lines of reefs or lodes traversing through it at almost right angles to the direction of the auriferous band of country.

The belt of country where the greater portion of the gold has been obtained is between the Shotover and Queen of Beauty Claims. At the former claim the gold was got at and near the surface, while at the Moanataiari Claim the best of the gold was some distance below the surface; and the richest portion of this band or belt of country seems to have gradually got deeper as it went southerly, as has been proved in the old Caledonian, Waiotahi, Cambria, Deep Level, Cross, Prince Imperial, Saxon, and Queen of Beauty Mines. The Prince Imperial Company did not get on to this band until it was down nearly 300 ft. below the level of the surface on the flat. Comparing the level of the place where the rich patch of gold was found in the Shotover Claim and the depth at which it was found in the Prince Imperial Claim there is a difference of about 462 ft. The distance from the Shotover to the Prince Imperial shaft is something like 2,442 ft., and, the depth being 462 ft., it shows the highly auriferous portion of the band or belt of country referred to is dipping in a southerly direction of 1 in 5·3, or at an angle of nearly 11 degrees. Coming southward from the Prince Imperial, the depth in the Saxon and Queen of Beauty Mines corresponds with this dip; and the inference to be deduced from this is that there is a high probability of rich auriferous stone being found to the southward of the Queen of Beauty shaft—and very little work has been done in this direction.

The most recent workings at deep levels to the south end of the field were in the Saxon Mine, the deepest level being 475 ft. below the surface. The stone underfoot in this level showed that it was equally as good as that worked above it; and in the adjoining mine—the Queen of Beauty—payable stone was cut at about 740 ft. deep in No. 11 level. Mr. Thomas Radford, who was manager of the Queen of Beauty when the pumping machinery broke down and operations in the mine were suspended, states that from the No. 11 level a cross-cut was driven for a distance of 48 ft., when No. 1 reef was cut, and was driven on for a distance of about 113 ft.—namely, 30 ft. to the south of the cross-cut and 83 ft. to the north. As far as was driven the reef was well defined and heavily impregnated with mineral. No stone was crushed from this reef, but Mr. Radford has no doubt as to its payable nature. A cross-cut was driven for a distance of 86 ft. from the shaft, where a leader was cut which showed gold. About 40 ft. was driven on this leader, and favourable indications of gold were got up to the last day of working. In carrying on the cross-cut for 24 ft. beyond the point where the leader was cut a lode was struck giving off a large quantity of strata on several occasions. Mr. Radford stated he saw gold, and forwarded samples of stone to the directors. A specimen of the stone was shown me which came from this level, and showed gold very freely.

On making inquiries of the mine-managers on the field as to the different runs or auriferous bands of country, they all agree that these dip in a southward direction. Mr. Radford, in a report to the Queen of Beauty Extended Company, states that from the surface down to 350 ft. the whole length of the lodes were payable for working, enabling good dividends to be paid; but, on sinking 150 ft. below this level, the lodes were not nearly so good. At the No. 8 level—537 ft. below the surface—the lodes were found as good, if not better, than ever they had been before. This run of gold continued down to a depth of 667 ft., when the stone became of a lower grade; but on sinking the shaft the country-rock improved in character, and Mr. Radford is highly impressed that a good shoot of gold-bearing stone will be got at deeper levels. This stone was abandoned owing to the company having insufficient funds to erect a new pumping plant. The plant they had consisted of two columns of pumps 12 in. in diameter. Before the machinery broke down these pumps, which had a 6 ft. stroke, were driven at the rate of twelve and thirteen strokes per minute, and even at this speed the pumps were not able to contend with the water; so that it was not a question of repairing the breakage which took place, but one of entailing a large outlay in entirely new machinery and pumps.

For some years nothing was done. But at length Mr. Christopher Harris undertook to go Home and get a company formed; and previous to leaving the colony he obtained a promise of a subsidy from the Government to the extent of £25,000 towards the cost of a pumping plant to drain the Queen of Beauty and adjacent claims. Mr. Harris succeeded in forming a company (the Thames-Hauraki Goldfields, Limited) having a capital of £300,000, with the view of providing a large pumping plant and sinking a shaft to a depth of 2,000 ft., the pumps to be of sufficient capacity to lift 2,000 gallons of water per minute, with engines powerful enough to do the work. The Queen of Beauty shaft was selected as the site for the drainage-shaft, which has been enlarged to 17 ft. 6 in. by 8 ft. 6 in. in the clear to 425 ft., or within 322 ft. of the depth that it had formerly attained (747 ft.), timbered with framed sets, 16 in. by 12 in., heart of kauri, each set 4 ft. 6 in. from centre to centre. In the annual report of the Inspecting Engineer, laid on the table of the House during the present session of Parliament, Mr. George Wilson says: "The importance of this work towards the development of the reefs at deep levels cannot be over-estimated. The plant which is being erected is of a substantial and efficient character, and shows the intention of the owners to provide ample power for drainage of the country to a depth of 2,000 ft. The cost of the undertaking will be great, and the subsidy of £25,000 provided by the Government is being fairly earned, the amount already paid towards the work being



From Photo. by Foy, Bros.

No. 2. Queen of Beauty Shaft, on day Property taken over by Mr. Haggard.

£2,593 11s. 1d.* The advantages from the drainage of this portion of the field, as the sinking progresses, will be first realised by the May Queen Company, which, as soon as the shaft is completed to a depth of 650 ft., will be enabled to open a new level and work a large block of ground under the rich quartz taken out at the No. 4 level." The following is a description of the machinery erected and in course of erection :—

BOILERS.

These are ten in number, of the Lancashire double-flued type, each 30 ft. long by 7 ft. diameter, to carry a daily working pressure of 120 lb. per square inch. They were, however, tested to 240 lb. per square inch.

Shell.—30 ft. long, 7 ft. smallest internal diameter, and of perfect cylindrical form, made of Siemens-Martin steel plates ⅝ in. thick.

Flues.—Two in number, 2 ft. 9 in. internal diameter, except the last two rings of plates at the back. Plates of ½ in. steel, welded longitudinally and flanged outside at ends; each length connected by a solid welded ring, so that all rivets are taken out of the action of the fire.

Mountings.—The whole of the boilers are completely fitted with all the necessary mountings, such as dead-weight safety-valve, high steam and low water safety-valve, check feed-valve, blow-off cock, glass gauge-cocks, pressure-guage, and brass pointer to show working level of water in boiler. Moreover, each flue is fitted with Howl's patent hot-blast forced-draught furnace.

PUMPING ENGINES.

These consist of one pair of horizontal compound condensing engines, capable of raising 2,000 gallons of water from a depth of 1,000 ft. in one minute. They are side-by-side compound type, with receiver and auxiliary steam-valve on low-pressure cylinder, and working on cranks at right-angles.

Cylinders.—The high-pressure cylinder is 31 in. and the low-pressure cylinder 59 in. diameter, both 5 ft. stroke. Each cylinder is steam-jacketed.

The steam-chests fitted at each end of both high- and low-pressure cylinders are fitted with variable expansion valves worked direct from crank-shaft, variable by hand. The range of cut-off is from nothing to ⅝ in. stroke.

The cylinders and steam-chests are clothed with asbestos slag, wool, and timber, and covered with planished steel plates secured by polished brass bolts 2 in. wide.

The cylinders are drained by a cock at each end, and the steam-chests are drained by a cock placed in a suitable position.

The governor is of the high-speed "Porter" type, controlling the supply of steam according to requirements, and maintaining regularity of movement combined with strict economy.

The crank-shaft is of the best hammered steel, and is 13½ in. diameter at bearings, and swelled in centre to 16 in. diameter. The crank-shaft pedestals are of massive construction, of strong cast-iron, fitted with heavy gun-metal steps, each made in four pieces, with wedges for side adjustment.

The fly-wheel is 15 ft. diameter and 20 in. wide, and weighs over 20 tons. It is fitted with spur-ring for barring purposes, and also connected to a pair of 10 in. barring engines.

The bed is of a strong box-girder section 18 in. deep.

The air-pump is worked from the tail slide of the high-pressure cylinder.

The circulating-pump is worked from the tail slide of low-pressure cylinder in a similar manner to the air-pump.

The condenser is of the surface-condensing type and has a cooling surface 2,450 square feet. The condenser body is of steel plates and angles.

The main feed-pump is of the single-acting type and is of sufficient size to supply feed-water to seven boilers.

The second-motion shaft is fitted to end of engine-bed for driving the mine pumps, the bearings of which are 20 in. in diameter and 30 in. long. The shaft is swelled to 22 in. diameter to receive the spur-wheel.

The pedestals are of massive construction, and fitted with heavy gun-metal steps, each made in four pieces, with wedges for side adjustment.

PUMPS AND PIT GEAR.

The pumps, rising mains, tanks, and spear-rods are suitable for raising 2,000 gallons of water from a depth of 1,000 ft. in one minute. This is to be effected in three lifts, each of 327 ft. in vertical height, and two sets of pumps, each set consisting of one open-top bucket-pump, having a bucket 25 in. diameter, and two plunger pumps, also 25 in. diameter, all 6 ft. stroke.

The spear-rods and connections are of sufficient strength to allow of further sets of pumps being added to lift 2,000 gallons of water from a depth of 2,000 ft.

The draw-lift pumps are of the open-top bucket type, 25 in. diameter, suitable for a stroke of 6 ft.

The pump buckets are of gun-metal and fitted with delivery-valves of the double-beat type, having a screw lift.

The wind-bores are of cast-iron, 26 in. in diameter, and fitted with a sliding rose-piece fitted with glands. The rose at the end is heart-shaped and has ample area through holes.

The rising mains for draw-lift are of lap-welded steel tube, each 26 in. in diameter, and of sufficient strength for a head of 327 ft. and to withstand a hydraulic pressure of 250 lb. per square inch.

The pump-rods for draw-lift pumps are of steel of ample strength, and made in convenient lengths, and joined with strong, secure, and readily detachable joints for each in removal.

ENGINE-HOUSE TRAVELLING CRANE.

A hand-power travelling crane is fixed on supporting columns in the engine-house for the purpose of erecting and subsequently overhauling and maintaining the various parts of the engine. The crane is capable of lifting and readily handling a load of 12 tons, and is fixed on gantries supported by cast-iron columns. It is 30 ft. from centre to centre of longitudinal rails, and is fixed at a height suitable for a lift of 18 ft. clear from engine-house floor-line. The crane is arranged for hoisting and travelling both longitudinally and transversely.

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* To 31st March, 1897; up to 31st October the amount paid was £16,629 14s.

Mr. Thomas Dunlop, the manager of the Thames-Hauraki Goldfields, is doing all in his power to expedite the important works now being carried out; while Mr. Hughes, who was sent out by the contractors to superintend the erection of the pumps and machinery, is a man of wide experience, gained in many parts of the world.

The Illustrations.

No. 1: The old Queen of Beauty when in working order in 1885, just before the pumping engines collapsed. Up to this time 137,887 oz. of gold, valued at £367,973, had been obtained from the mine.

No. 2: Queen of Beauty on the day that the property was taken over by Mr. Haggard on behalf of an English company.

No. 3: Thames-Hauraki (old Queen of Beauty shaft) during the Jubilee week, when one of the boilers was being delivered on the ground, for which fourteen horses were required.

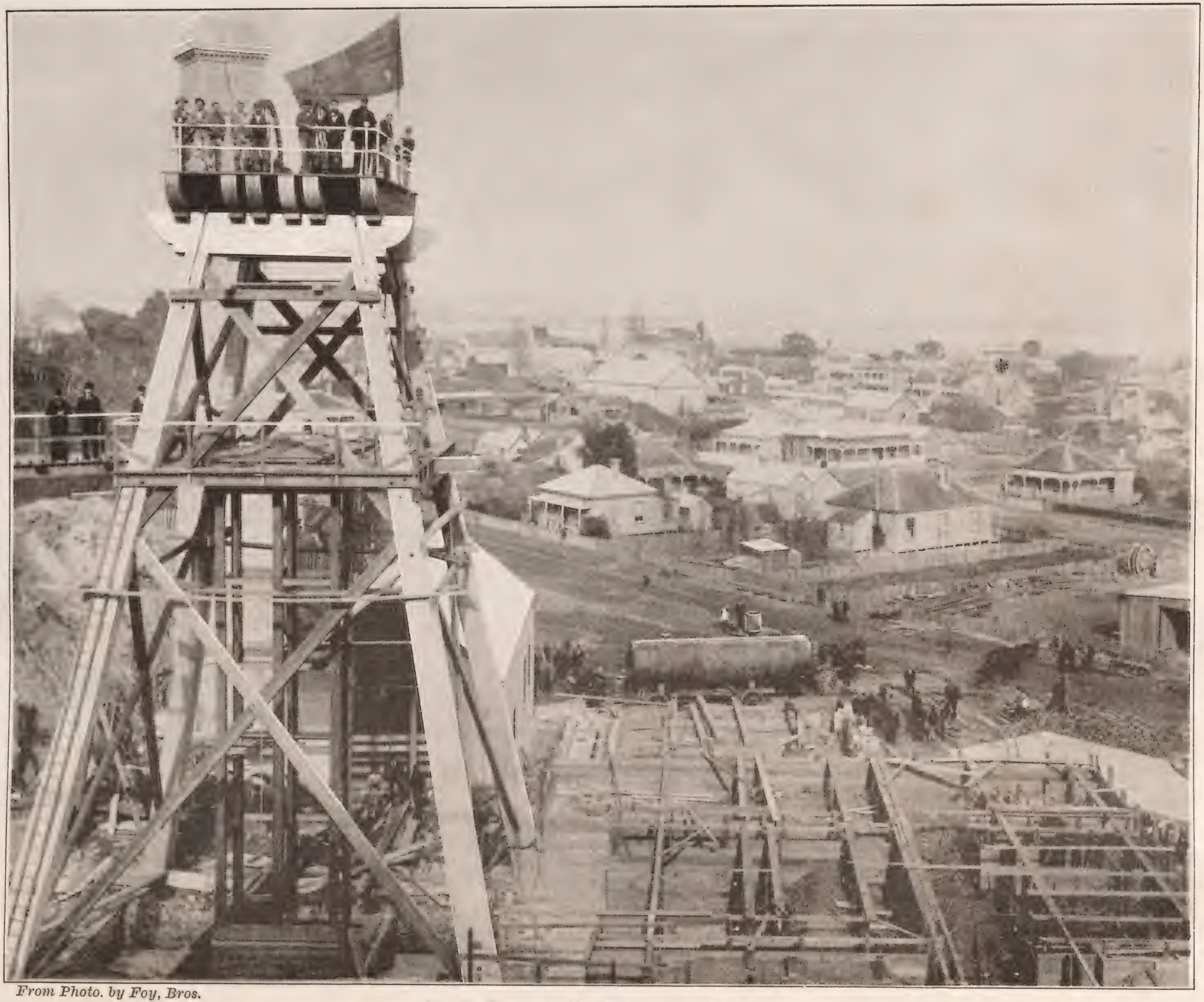
No. 4: Boilers for the Thames-Hauraki pumping-shaft.

No. 5: Poppet-heads, chimney-stack, &c., Thames-Hauraki.

EARLY GOLD DISCOVERIES AT OWHAROA.

[By Mr. John McCombie, Manager of Woodstock Gold-mine, Karangahake.]

In the spring of the year 1876 Messrs. Barrett, Arnold, and party started prospecting operations north of Karangahake, and they gradually worked their way out to the place now known as Owharoa, where they found strong surface indications of gold-bearing-reefs. This led up to the location of the Smile of Fortune, Annie, and Morning Light claims. Systematic prospecting in the Smile of Fortune resulted in discovery of payable ore, and the claim was formed into a company. Subsequently arrangements were made with Mr. J. R. Perry for the construction of a fifteen-head stamper battery, which was completed, after a long period of delay, owing chiefly to want of road accommodation for the transit of machinery. Then the battery started, but, as is often the case, the returns did not realise expectations, and as the shareholders either could not or would not pay calls, the manager was obliged to suspend operations. The mine and battery were then let on tribute, and the tributers very soon ascertained that the precious metal was not confined to quartz, but that it was also diffused throughout the surrounding rock, known as propylite. A careful examination of the different tip-heads revealed the fact that the material of which they were composed was rich in the precious metals, and some hundreds of tons of this stuff was subjected to battery treatment for bullion returns, which paid the tributers handsomely. Later on Oats and party, tributers, took out £2,000 worth of bullion with one month's run of the battery, and then the concern reverted to the company, on whose account several successive dividend-paying returns were obtained. The payment of regular dividends, without any provision being made for fresh developments, landed the company in difficulties a second time, and again the mine passed into the hands of tributers, who worked it profitably right up to a late period, when the property was taken over by the Ohinemuri Syndicate. Here the gold occurrence is entirely different from that of any other part of the Peninsula with which I am acquainted, and experience gleaned elsewhere is of precious little service to a gold miner in this locality. Really a "new chum" would be more likely to succeed than an "old hand," because both would have a lot to learn, and the former nothing to forget. Throughout the old mine-workings the gold-bearing formation partakes of the character of the country rock—propylite—and it needs the eye of a man who is practically acquainted with the mine to determine where the auriferous stuff begins and where it terminates. In some places the gold-bearing country was broken out to a width of 16 ft., and treated by the ordinary battery process for bullion returns which paid handsomely. This formation was interspersed by innumerable veins of flinty quartz running in every conceivable direction, and varying in thickness. Wherever these "flinties" junctioned, forming a bunch of ore, it was a certainty to find specimens worth as much as 2 oz. of gold to the pound of stone, and there also would be found a corresponding increase in the value of the general ore. Except the Smile of Fortune spur, where the auriferous series of rock crops out, the whole country is overlaid by a lava deposit, varying in thickness, but presenting an insurmountable obstacle to the unaided prospector, and this will account for the want of advancement on the part of the place during the many years it has been opened for gold-mining purposes. So far as explorations in the old section of the Smile of Fortune property have gone, everything tends to prove that good ore will be got underfoot, and that the small lodes met with in the surface workings will make into strong ore bodies going downwards. The Ohinemuri Syndicate, to whom this property now belongs,



From Photo. by Foy, Bros.

No. 3. Thames–Hauraki, Jubilee Week.

are sinking a shaft to test the lodes at a depth, and I think it is more than probable that their efforts in this direction will be attended by success. Hereabouts large sums of money have been frittered away upon shallow tunnelling, in country which the most careless observer must conclude is not favourable to the existence of gold-and silver-bearing lodes. Nevertheless this system of mine-exploiting is still going on, and the gold-mining industry will be debited with the expenditure, whereas it should be charged home to the imbecility of the persons who are responsible for carrying it out.

[The above arrived too late for insertion in the last issue of the *Record*.]

ADVERSE CRITICISM OF NEW ZEALAND MINES.

THE "Wandering Correspondent" of the *Financial Times* has caused considerable sensation in London financial circles by his strictures on Western Australian and New Zealand mines, but his statements have not been allowed to go unchallenged. In interviews with a representative of the *British-Australasian* Sir Westby Perceval, ex-Agent-General, Mr. Thomas Mackenzie, ex-M.H.R., representative of the Farmers' Co-operative Association in England, and Mr. John Banbury, an old Thames resident, who has been paying a visit to the Old Country, gave an emphatic contradiction to the more sweeping charges made by the "Wandering Correspondent," and these interviews were followed up by a letter from Mr. Frederick H. Whalley, C.E., who spent some years on the Hauraki Goldfields. The following extract from "R.R.'s" letter will give an idea of the general style adopted:—

> I have ridden hundreds, I might almost say thousands, of miles in New Zealand, and I have not seen half a dozen genuine mines. In some districts, such as Waitekauri, the reefs are big, and many of them carry gold, but I could never satisfy myself that the shoots were big enough to pay any English company to work—except under certain conditions. £50,000 companies, with half set aside for working-capital, might pay. Expenses of mining and milling are decidedly moderate—say, from £1 10s. to £1 15s. per ton—so that £3 per ton would leave a handsome profit. Most of the better-known English companies now working are well managed. But it is a mercy that the boom which has done so much for Western Australia died out before it could reach New Zealand; otherwise we should have reaped the finest crop of "wild cats" ever sown for a British public. There are hundreds of mines at the Thames, the hills are honey-combed with tunnels, but up to the present the output of gold has been ridiculously small. As long as these mines were small local companies, economically handled, they paid their way, and occasionally, when they come upon a rich patch, paid a dividend. But now that so many of the more hopeful have been taken over by English syndicates with huge capitals, I cannot see how they will ever pay any dividend. We must never forget that mining has been going on at the Thames for thirty years—sometimes with considerable success—so that every acre of ground has been carefully prospected, and all the reefs are not only well known but their values accurately ascertained.

With regard to mining at the Thames, the present condition of the industry in that field is somewhat analogous to that of the Bendigo (Victoria) Goldfield thirty years ago, and Charters Towers (Queensland) twenty years since, when most of the mines in those places had been worked to the water-level, and development works had to be proceeded with. When the works now in progress at the Thames-Hauraki are completed, and the mines in the immediate neighbourhood are drained and can be profitably worked, the history of deep sinking at Bendigo and Charters Towers will, in all probability, be repeated at the Thames. Mr. McCombie's interesting sketches of the early discoveries at Waihi and Waitekauri, which have appeared in the columns of the *Record*, should tend to show "Wandering Correspondent" that he is only repeating to-day what others just as flippantly asserted in reference to those important mines eighteen or twenty years ago. Yet the Waihi mine has already paid £228,500 in dividends to its shareholders.

If we turn back to the records of gold-mining in the early days of the Thames, sufficient justification will be found for the important development works now in progress on that field. In the "Handbook of New Zealand Mines," published in 1878 under official authority, the following interesting facts are recorded in pages 290–91:—

> The ores found in the Thames Peninsula have been exceedingly rich. Hunt's Shotover Claim gave such large returns that the four men who originally held it —Messrs. Hunt, Cobley, White, and Clarkson—are said to have netted £40,000 a piece, whilst the shareholders in the company subsequently formed received £15,120 in dividends. The Long Drive Company paid the fortunate shareholders (amongst whom was H.R.H. the Duke of Edinburgh) £82,000 in a few years. The Manukau Company, which had one of the richest shoots of gold recorded in the annals of quartz-mining, paid £15,750. The Golden Crown Company, irrespective of the large amount divided by the original shareholders, paid £141,904. The Caledonian Company paid about £500,000 during the first year of its existence. The Moanataiari Company, from whose mine over 10,000 oz. of gold was got in one week, paid £117,993; Nonpareil Company, £14,670; Kuranui Company, £41,277; All Nations Company, £41,445; Old Whau Company,

£11,650; Cure Company, £17,000. In the golden era of the Thames, when 15,000 miners were scattered all over the hills and gullies, there were many other rich mines, such as the Alburnia, Dixon's, and Middle Star (in the Moanataiari and Punga Flat district), and the Queen of Beauty, City of London, Queen of the May, Bird in Hand, and Bright Smile (in the Waio-Karaka district), which paid large dividends, of which there are no records. In later times the New Prince Imperial Company paid £60,750 in dividends in three years. The claim had been allowed to remain idle for several years, and was sacrificed by the original owners for £800—the value of the plant. The new company had only expended £450 when a rich run of gold was met with, and followed to a depth of 500 ft. The Waiotahi Company, though it has had no brilliant return like some of the other mines, has paid £18,000 in dividends. The Cambria Company, whose mine is now looked upon as one of the principal mainstays of the Thames, started in December, 1884, on what was practically virgin ground, and paid £48,825 in dividends in one year, the lucky shareholders receiving £1 11s. per share in dividends for an outlay of 1s. 2d. per share. The average yield was about 30 oz. per ton. The Waitekauri Company, at Ohinemuri, came on a very rich piece of ground (still remembered in the district as the "big blow"), and in a short time paid over £4,000 in dividends.

These and other records were within easy reach of "Wandering Correspondent," had he cared to consult them. As to the writer's assertion that he had "not seen half a dozen genuine mines," he could easily have found that number within a radius of a dozen miles in the Ohinemuri district alone. He might also have been informed, had he taken the least trouble to learn, of the enormous quantity of gold (nearly two tons) produced by the Hauraki and other mines at Coromandel, as well as at Reefton, Cromwell, and other parts of the colony.

Captain Hodge in Reply to some of "R.R.'s" Criticisms.

Replying to some of the "Wandering Correspondent's" criticisms, Captain Hodge, who is in charge of a number of mines at Coromandel owned by English companies, said, in the course of an interview with a *New Zealand Herald* reporter:—

"There is a true auriferous belt in Coromandel, which, to traverse, may be easily understood by striking a line from the Union Beach (a section of the Hauraki) and Golden Pah to the Royal Oak of Hauraki. The width of this belt I put down approximately at about 4,000 ft., and its length at 20,000 ft.; at the same time there are branch belts uniting the main one in question with alternating barren rocks along the length of the 20,000 ft."

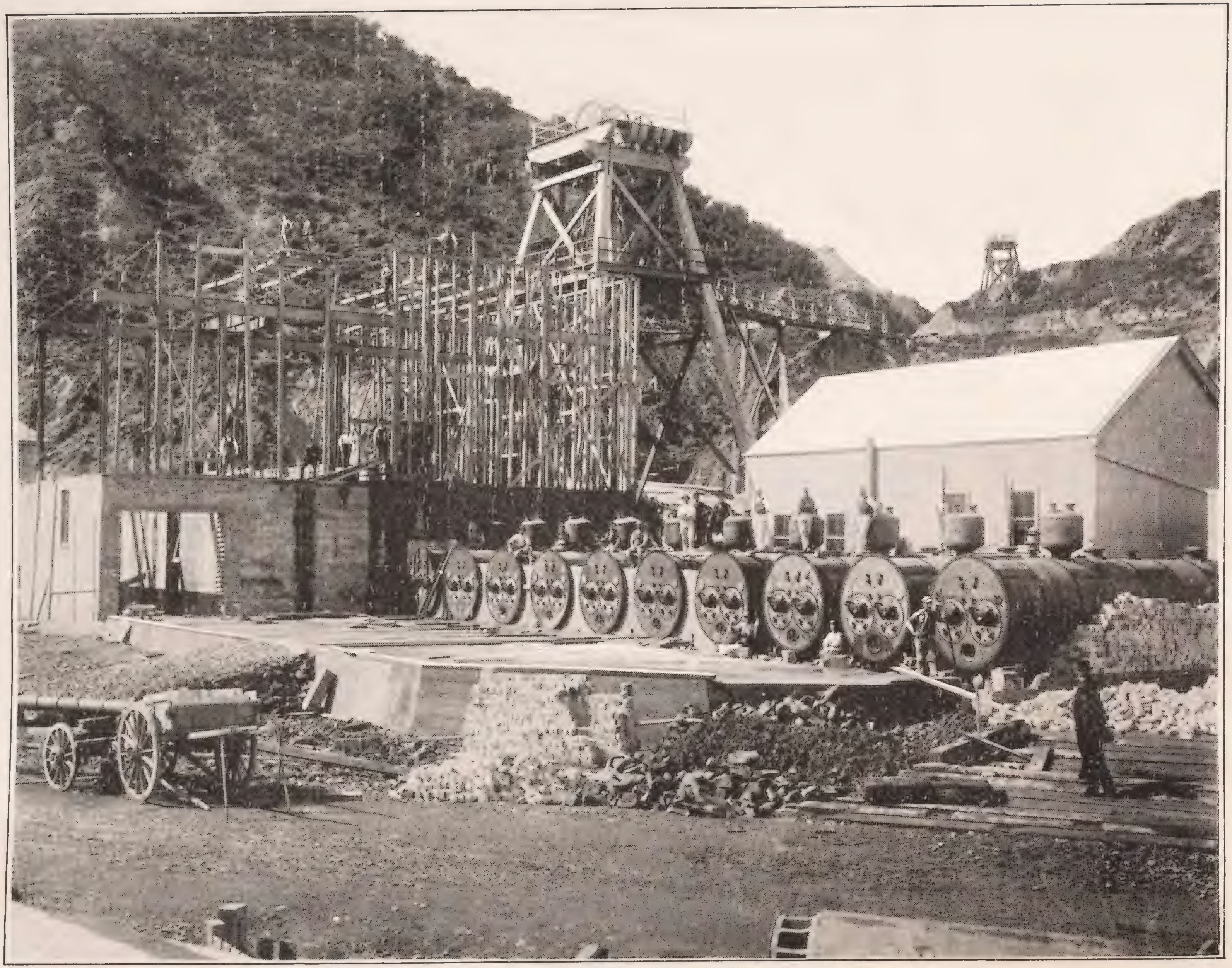
"Then how much of this main belt has been developed, and with what results?"

"You are asking me a question. But, anyhow, I can give you a fairly approximate answer. Take the Union Beach: The first 180 ft. below the surface or sea-level paid nearly £40,000 in dividends, and was abandoned because the machinery could not go deeper. The Hauraki 300 ft. is a poor level at that depth. The 160 ft. was almost equally poor, but was richest between that and the 220 ft. Deeper sinking which is now being carried on may prove similarly. This company has paid £136,000 in dividends, and leaves the nominal capital of the company £40,000 cash in hand, with a new pumping plant equal to any reasonable depth—say, 1,500 ft.—at work. The Kapanga returned immense quantities of gold in the early days, before English people got interested. I think it can safely be said that the company has paid £100,000 in dividends. Then comes Scotty's, which is adjacent to the Kapanga, and a rich property. It must have paid well in the early days, taking into account the limited developments—say, another £30,000. Then follow north of Scotty's and you find various claims worked by tributers in the early days in small sections. The results of returns cannot be accurately got at—put it down at another £100,000. Now, come to the Big Trunk Reef, averaging 60 ft. wide (which, by the way, is going to be rich in depth), and we get to the Royal Oak and Tokatea, which have paid—say, £80,000 in dividends. There are other rich claims between the Royal Oak and the footwall of the Big Reef, the results of which I cannot estimate. However, if we measure the area of the claims worked in the auriferous belt, it is about 6,000 ft. altogether in length, and about 1,500 ft. in width. Of course, this is not nearly developed; the area given simply means boundaries with the claims referred to. They have yielded profits of, say, half a million. Now, to my knowledge, there were only two pumping plants in Coromandel ten years ago—one equal to pumping 180 ft. at the Union Beach, and another to 420 ft. at the Kapanga. But to-day we have the most capable pumping plants for deep mining, for the area, of any section of the goldfields in New Zealand, and that mostly erected during the past two years. This is a step in the right direction, and will, if I am right, bring a vast amount of gold bullion to light in the future to recoup shareholders, and that in a shorter time comparatively to any goldfield yet discovered."

"So far, so good. But, on what, in your experience of Coromandel, have you based the probabilities of realising such results? We have a group of new mines at work intermediate between the ones you enumerate above."

"Yes. Adjacent to the Hauraki we have the Kathleen, a property on which little or no prospecting can be done at surface, that being sea-level. There is a fine pumping and winding plant here, and a series of reefs being developed at the 200 ft. level; the more work we do on them the more sanguine I am that, although we have not yet struck the yellow metal, if indications go for anything, we shall come out right in the end. Adjoining us is the Kathleen Crown, who own a splendid plant. Here the reefs, which are prospected at surface, and are thrown up considerably higher than the Kathleen, are well charged with heavy-leaf and coarse free-milling gold-ores. The future prospects of this property are all one can wish for; it could not be worked before, being private property, and without machinery. This has now been overcome, and I have no doubt the shareholders will have a good reward after a fair opening out of reefs. The same remark will apply to Blagrove's Freehold."

"There are a few points which have been commented upon I should like to be clear about. It has been said



From Photo. by Foy, Bros.

No. 4. Boilers for Thames–Hauraki Pumping Shaft.

there is no series of reefs in Coromandel. Can you explain this ?"

"I think what is meant is, there is no series of reefs traversing the line of auriferous belt from mine to mine. This, if so meant, is correct. But there are various series of reefs, I may say, traversing the width of the belt, at right-angles and obliquely. On entering the barren rocks, these become poor. The mass of stringers referred to are simply a network of feeders to the main series of reefs in the belt. It would, however, be a hasty conclusion to say that the belt referred to, which must be taken from a surface point of view at 2,000 ft. wide, will not prove in depth to undermine and widen some of the upper series of rocks, as they are, although non-auriferous, of the andesite type, and may be an apron to true auriferous rocks deeper from the surface."

"But must the andesite be decomposed, to find gold ?"

"The richest gold discovered in the Hauraki between the 160 ft. and 220 ft. was in a very hard and compact andesite ; as soon as we overtook, in depth at the 300 ft., a decomposed andesite patch, it quite cut off our gold. But, as appearances go, from the strike of a harder series of rock more easterly dipping towards the Hauraki shaft, I am of the opinion that we shall again have the harder andesite in deeper levels, and, comparatively, in depth deeper and more reliable chutes of rich gold-ores. While referring to harder rocks, I may say that at the Royal Oak of Hauraki we have in our present working a very hard rock, in which our reef is turning out so rich. Unlike the andesite, it is a metamorphic calcareous slate rock all below the No. 3 level. This rock is only found on the footwall side of the Big Trunk Reef."

"As to the Big Trunk Reef, this has apparently been referred to as a huge buck reef, which has been explored more or less of late years with but little success ?"

"I have tried it myself, I believe, more than any one else, and I have come to this conclusion, based on experience of similar reefs : that the offshoots from the reefs at shallow depths are rich, but the offshoots die out in depth. The Trunk Reef itself in depth, as far as my experience goes, should prove rich. This buck reef (so-called), I believe, in depth will be the permanent source for the great bodies of gold-ore anywhere in depth in the width of the main auriferous belt, and also in any alternating auriferous belts in its traverse north and south throughout the peninsula. Surface bodies of gold-ore are likely to be discovered in any alternating belt in traversing the peninsula. Coromandel, truly speaking, is the richest field you can possibly encounter, and once you get a find or chute of gold-ores, a big sum is possible in a few years. But, as Mr. Hartridge has said, the district is pockety, and you stand to win a fortune ; but you must not be disappointed if you lose. I think his latter remark could be obviated if interest were taken in the whole group of Coromandel English-managed mines, 'then the chances to win would be almost certain.'"

MR. JOHN BANBURY ON THE MINING INDUSTRY.

The following report of the interview with Mr. John Banbury, who has a clear grasp of the present position of the mining industry in the Hauraki Goldfields, appeared in the *British-Australasian* of the 23rd September :—

MORE ABOUT GOLD-MINING IN NEW ZEALAND.—A CHAT WITH MR. JOHN BANBURY (Member of the Auckland Chamber of Mines).

It is not surprising that colonists interested in the development of gold-mining in New Zealand should be anxious to refute many of the libellous and irresponsible statements which have recently appeared in the financial Press on the subject, and to place the present position of the industry before the British public in its proper light. Amongst those who are entitled to a voice in this matter is Mr. John Banbury, member of the Auckland Chamber of Mines, who went out from this country to New Zealand in 1863, and who has been more or less connected with gold-mining from that time to the present He was one of the pioneers of the Coromandel fields, and was present at the opening of the Thames in 1867.

"To give you some idea of the richness of our mines," he said, "the Caledonian within two years of its discovery turned out over £2,000,000 worth of gold. Half a million was obtained in the first nine months."

"But what is it doing now ?"

"It is to-day known as the Kuranui-Caledonian, and they are putting up works to get down to the deep levels."

"Then all this gold was obtained from the surface ?"

"Not all. Down to the 160 ft. level we came upon a series of jewellers' shops. The £1 shares went up to £220, and time after time £40 per share per month was paid away in dividends."

"Why, the shares now are down to a few shillings !"

"That is so. The great fault of our mining in the early days was, that all that was won was distributed, and no thought was given to a reserve. The consequence was, that when we had of necessity to get down to the lower levels we had to make calls, and this gave rise to those non-liability companies that 'The Wandering Correspondent,' who signs himself 'R.R.,' speaks of in the *Financial Times*."

"And what do you think of these 'no liability' companies ?"

"Well, I may as well explain that the main object in starting these 'no liability' companies was to induce small capitalists to invest with the knowledge that they would not be ruined by calls. You can pay 2s. or 3s. on a 5s. share, and if it is found that more money is needed to develop the mine, you can resign your shares to the company and be quit of all responsibility. The men who are earning from 7s. to 8s. a day are amongst our greatest mining investors, and they know that under the 'no liability' they cannot be sold out of house and home."

"How was the mining industry looking when you left the colony ?"

"Never better, in so much that so many of the English companies are going on with systematic development, which, of course, means time. Very few mines can be opened up, equipped with machinery, and put into working order under two years. I have had conversations with two mine managers within the last week on this subject. The cry is, 'How is it that New Zealand is not giving returns ?' Simply because the mining plants are not yet complete. Some eight or ten are now in course of erection, and within the next six months, when the mines are thoroughly equipped, crushing operations will be in full swing, and largely increased returns ensue."

"And where are the mines situated on which these batteries are being erected?"

"In the Coromandel, Kuaotunu, Puru, Tairua, Whangamata, Tapu, Maratoto, Komata, Waitekauri, Waihi, and Wharekiraupunga districts. It is only about twelve months since these claims were taken up by English companies. The Talisman is one of the latest batteries started, and that gave a return of nearly £4,000 the first month."

"Do you find that the Government are giving you every encouragement?"

"They are certainly showing great interest in the development of the industry. A very important move is now being taken in Auckland towards the establishment of a mining exhibition, in which will be shown the most modern machinery and latest appliances for gold saving. The main object, of course, is to train the colonists in the treatment of the ore, we having been up to the present behind all parts of the world in this respect. On our main field, the Thames, the cyanide process is not yet in use."

"How is that?"

"Partly because the old batteries were not fitted for it, and partly because the gold is found in different forms in different parts of our goldfields. The batteries on the Thames are for the most part of a very primitive kind, and the stamps weigh only from 5 cwt. to 6 cwt., whereas the new battery on the Waihi will have stamps weighing 12 cwt. One hundred stamps of this weight will be ready for working about November, and then you may look out for some returns that will astonish the shareholders."

"I have heard it said that the cyanide process is going to revolutionise New Zealand mining?"

"That is so. Our gold is so intensely fine that it can only be saved by this process. Down in the Kuaotunu district I have crushed stone in which the gold was so fine as to be scarcely discernible, and after panning off all the slime from the dish the gold would adhere to the metal, and when the water swilled back again it would all float on the surface like quicksilver. It is when in that state that the chemical action of the cyanide absorbs it."

"And what about the mining laws? Are they satisfactory?"

"The Government are taking very stringent measures as regards rentals, which will have the effect of weeding out many of the properties which have been taken up, but which are not sufficiently valuable to be retained by the local owners. That will be a great safety to the investing public, inasmuch as the owners won't continue to pay rents for lands which they don't believe in."

"And for those they do believe in?"

"They will work. The letters just to hand from my partners are to the effect that the local owners are more willing than ever to pay calls and develop their own properties, with the idea ultimately of purchasing machinery themselves. New-Zealanders, will not be content in the future to accept from 20 to 25 per cent. from English capitalists for their proved properties; and until more favourable terms are forthcoming you will find very few really genuine shows brought to London."

Mr. Banbury, who has come over chiefly in connection with some legal proceedings, returns to Auckland about the end of November.

THE GEOLOGY AND VEINS OF THE HAURAKI GOLDFIELDS.

[By Mr. James Park, F.G.S.]

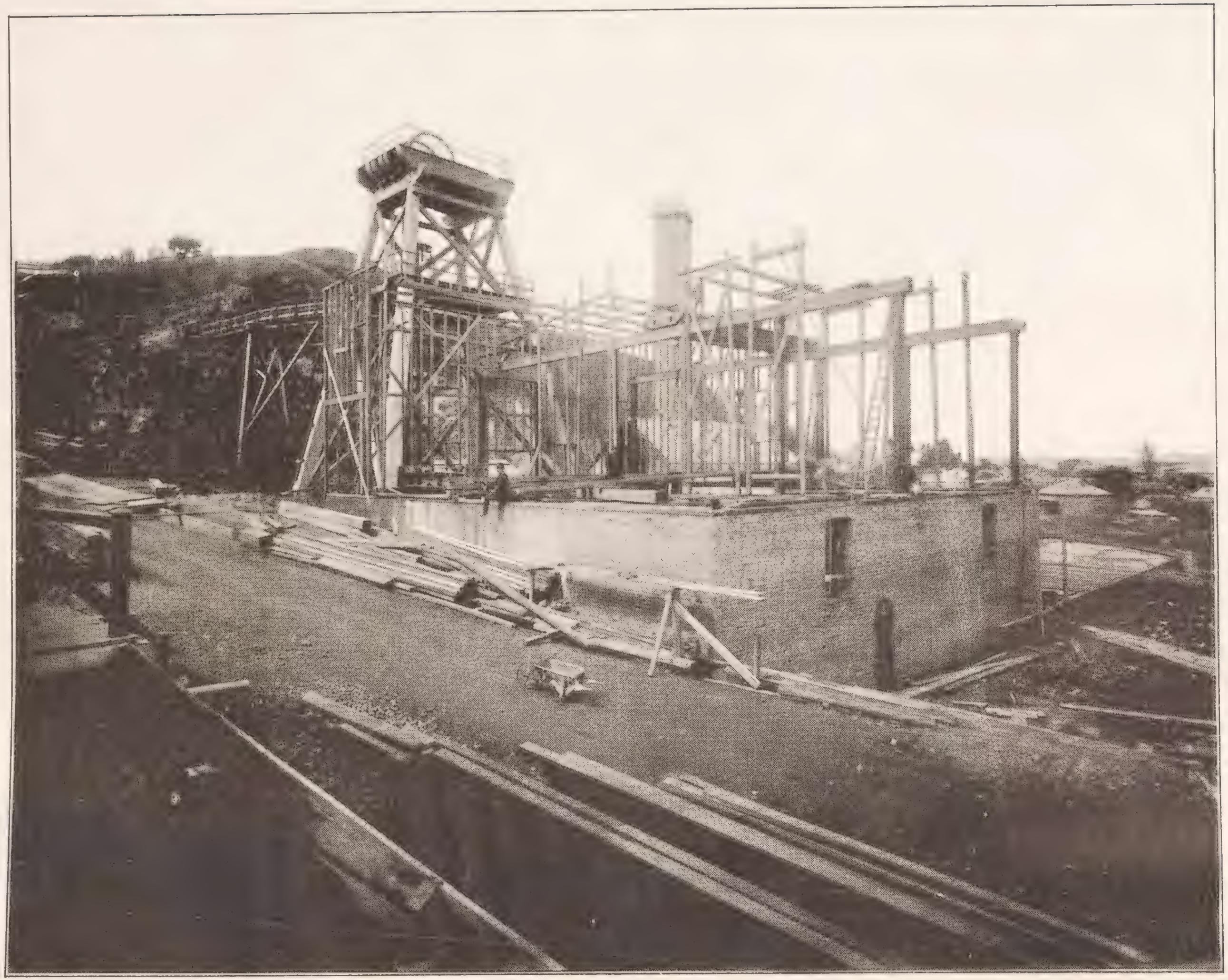
(Read before the New Zealand Institute of Mining Engineers 9th August, 1897.)

MR. PARK'S paper treats in a very complete and comprehensive manner with one of the most interesting and, at the same time, one of the most difficult and puzzling gold-bearing areas in New Zealand. The paper, a copy of which has been forwarded by the Council of the Institute of Mining Engineers, forms a handy volume of 104 pages, and is illustrated with a number of photographs and fifteen plates of sections, interspersed throughout the letter-press. It is accompanied by a separate pocket, containing a large coloured geological map of the Hauraki Peninsula and a coloured section of the Thames Goldfield, on a large scale, showing the shafts, levels, veins, hard bars of andesites, and different zones of gold-bearing country.

The first part of the paper is devoted to a description of the physical features of the peninsula, mention being made of the ranges, forest vegetation, coastline, harbours, rivers, and water for mining purposes. Then follows a short *epitomé* of the work of previous geological observers, the wide and divergent opinions of such eminent geologists as the late Dr. von Hochstetter, Sir James Hector, and Professor Hutton, showing very clearly the puzzling character of the rock structures. But whereas these scientists spent only a few weeks in collecting their information, Mr. Park possessed the advantage of several years' residence on the goldfields, thereby enabling him to acquire an intimate knowledge of the different rock formations and the various geological structure, and at the same time become acquainted with the distinguishing features of the principal gold-bearing veins throughout the peninsula.

Regarding the general geological structure, the author states that all the main ranges and most of the highlands of the peninsula are occupied by great masses of Tertiary volcanic rocks, occurring as solid flows, agglomerates, or consolidated ash-beds, generally called tuffs or breccias. In character these rocks vary from the basic andesites to highly acidic rhyolites, the different types marking different phases and periods of eruption—the andesites marking the earlier, and the rhyolites the later outbursts.

At most places the gold-bearing andesitic rocks rest directly on highly denuded surfaces of a great series of Palæozoic slaty shales and greywacke, which form the basement rocks of the peninsula. In a few



From Photo. by Foy, Bros.

No. 5. PoppetHeads, Chimney-stack, &c., Thames–Hauraki.

places, in the Cabbage Bay district, a marine formation of Lower Eocene age interposes between the andesites and slaty floor, thereby affording valuable evidence of the age of the andesites themselves.

The greatest surface development of the Palæozoic rocks is found in the Kuaotunu district, in the neighbourhood of Cabbage Bay, and in the country between Coromandel, Manaia, and Taupo, on the west coast. In other places they occur only as small isolated patches, exposed by denudation on the coast-line or in river valleys.

On the west coast, and in the northern portion of the peninsula, the gold-bearing andesites are followed by a great accumulation of andesitic breccias and tuffs, which often exhibit a rudely stratified appearance, and at the base of which occur coaly shales and leaf-beads of Miocene age. In the east coast districts, lying south of Mercury Bay, and around Waihi, the andesites are obscured over large areas by heavy flows of rhyolite lava of probably older Pliocene age.

There are two gold-bearing formations in the Hauraki Peninsula, the older being the greywackes and slaty shales of the Palæozoic series, and the younger the andesites of Lower Tertiary age. Both formations are developed in the Kuaotunu and Coromandel districts, but the andesites are economically by far the most important and widespread, forming the gold-bearing rocks of the Coromandel, Whangapoua, Thames, Karangahake, Te Aroha, Waihi, Waitekauri, and Te Puke Goldfields. The Palæozoic rocks consist principally of black, blue, and pale yellowish-grey slaty shales and greywacke.

In a region where the evidences of volcanic activity of an intense character are to be found on every hand, the investigation of the geological relations of the different members of the Palæozoic series is necessarily attended with much difficulty. In most places both the slaty shales and greywacke are bent and folded in all directions, with an ever-changing dip and strike. In many places the slaty rocks are shattered into a crumbling mass of small angular fragments, or crushed into small lenticular flaky pieces presenting shining slickensided faces. The greywackes, when seen in the deep-cut courses of a mountain stream, or on a rocky shoreline where fresh, undecomposed surfaces are exposed, are found to consist of a highly indurated aggregate of rounded or subangular fragments cemented in a silicious matrix. The fine-grained varieties can hardly, at first sight with the unaided eye, be distinguished from some of the compact andesites of the overlying gold-bearing series. In many places the rock is so pervaded by the silicious cementing matter that its grains seem to graduate into each other as well as into the surrounding matrix. The prevailing colour is dark-grey or greenish-grey. In the absence of distinct fossils there is nothing to fix the age of these primary rocks, and for the present the author places them in the Devonian period. Near Cabbage Bay a few isolated patches of a fossiliferous marine series of Lower Eocene age rest on highly denuded surfaces of the slaty shales. The marine beds in their turn are overlain by great masses of volcanic ejecta belonging to the base of the gold-bearing formation.

Both from its widespread character and economic importance, the andesite formation of volcanic gold-bearing rocks naturally claims the most attention. The andesites are the principal gold-bearing rocks of the Hauraki Peninsula. They consist of solid andesites, and andesite agglomerates, tuffs, and breccias, which are found solid and unchanged, and also in all stages of decomposition, giving rise to an endless variety of forms. Vesicular rocks are entirely absent. There is no appearance of old vents to be seen, and the author is inclined to the belief that the eruptions took place along great fissure rents in the earth. The volcanic origin of these rocks would not lead one to look for any distinct order of succession among the materials except in limited areas, but in most places the basement of the igneous series consists of a vast accumulation of agglomerates and coarse breccias intercalated with solid sheets of andesite. The fragmentary matter is succeeded by great flows of andesite, in places a thousand feet thick, and often associated with layers of tuff and breccia, which, the author suggests, may have originated as friction breccias, at any rate in some places.

The gold-bearing veins are seldom, or never, found in the tuffs, breccias, or agglomerates, but always in the decomposed andesites, for which the author proposes to adopt the distinctive name "propylite," in the restricted sense proposed by Rosenbusch. Generally speaking, the gold-bearing andesitic rocks may be said to consist of augite-andesite, in which the augite is partly or wholly replaced by hypersthene. They sometimes contain a little free quartz, giving a form closely related to dacite. They present all forms of texture, from the dense black fine-grained columnar augite-andesites of the Kauaeranga Valley, and Broken Hills, Tairua, to the coarsely crystalline hypersthene-augite-andesites of Waikawau, Mata, Hope, Port Jackson, and flanks of Moehau. At the last-named places the andesites occur as great intrusive dyke-like masses, ramifying the Palæozoic slaty shales and greywacke in all directions. Their present surface exposures, on sea-cliff or mountain-ridge, are the result of prolonged denudation; and the coarsely crystalline, almost granitoid, character which they assume is obviously due to the intrusive magma cooling slowly and under great pressure.

The exact character of the andesites remainded for long a puzzle to geologists. They are now, however, known to be the same as, and to possess many of the peculiar features of, the rocks of the Comstock lode and Washoe districts of North America, and the ancient mining regions of Hungary and Transylvannia in the Austrian Empire. The resemblance to the North American rocks is so striking that the geology of the celebrated Cripple Creek mining area reads like a chapter from the geology of the Hauraki Goldfields. One of the most prominent features of the andesites is their extreme proneness to decomposition. The author discusses this phase of the subject at considerable length, very properly distinguishing the surface decomposition or weathering from the deep-seated alteration. When exposed to the atmospheric agencies, the andesites exhibit rapid alteration by the elimination of the alkalis of the felspars. The weathering proceeds from numerous centres, thus producing a spheroidal mass with concentrically exfoliating layers like an onion. In many of the older mines at the Thames and Coromandel the andesites are found altered into the soft "miner's sandstone" or "kindly country," technically known as propylite, at a depth of 600 ft. or 800 ft. below sea-level. The transition from the soft propylite to the hard undecomposed andesite is clearly exhibited in many of the mine workings, and forms an interesting study.

The author, who was the first authority to ascribe the deep-seated alteration of the andesites to the leaching action of thermal waters, gases, and steam, adduces numerous facts bearing out his contention. He has shown that the solid andesites contain both gold and silver; and he is of the opinion that the andesites were leached, and the contents deposited in cracks and fissures resulting from the contraction of the cooling masses by electro-chemical action, the cracks when filled with mineral waters forming, in fact, great Voltaic cells.

The different varieties of andesite are described at some length, and valuable notes on the petrological and microscopical characters of the typical kinds are supplied by Professor Ulrich, F.G.S., the samples for examination having been collected by the author for that purpose.

The Tairua tuffs and breccias form the closing number of the andesitic gold-bearing series. They are trachytic in character, and in places exhibit a distinctly bedded structure. They are often intercalated with flows of augite-andesite; and appear to have been subjected to prolonged solfatara action with the result that great masses of silicious sinter, often porous, chalcedonic, or opaline, have been formed in many places. Gold is generally found in small quantities in these silicious masses, and the secondary quartz veins traversing them are often rich, but unfortunately of a superficial character.

The author, from the evidence obtainable at Cabbage Bay and Whangarei Heads, places the age of the andesites as Upper Eocene, or not much different from that of the American and Hungarian andesites.

In his geological map Mr. Park has refrained from distinguishing the different rocks of the gold-bearing series, as he did in his map of the Thames Goldfields in 1894. The different groups of andesitic rock are so intimately associated that it would take many years of careful detailed survey, aided by reliable topographical maps, to extend the three subdivisions of the gold-bearing series the author adopted at the Thames over the whole peninsula.

The gold-bearing series is followed at Coromandel and the Thames by heavy deposits of volcanic tuff and breccia of an andesitic character, often rudely stratified, and containing masses of wood-opal, and silicious veins and segregations in the form of jasper chalcedony and agate, with occasional threads of fine opal. These breccias form the islands and headlands enclosing Coromandel Harbour, and occupy the western flanks of the foot-hills between the Thames and Paeroa. The author considers these rocks of Miocene age, but says their exact relation to the underlying gold-bearing andesites is not very clear. That they are younger is proved pretty conclusively by the very clear sections from Beeson's Island to the Kapanga shaft at Coromandel. Their relation to the Tairua tuffs and breccias is also very obscure, but they will probably be found to be contemporaneous or somewhat younger.

On the east coast, at Waihi, Mercury Bay, and Tairua, the gold-bearing andesites are obscured by great flows of rhyolite. The Waihi rhyolites are grey and pumiceous on the surface, passing into a hard drab-coloured rock in the solid, in which sanadine crystals are conspicuous. The Mercury Bay rhyolites, on the other hand, are seldom frothy or pumiceous, but are distinguished everywhere by a fine development of spherulitic structure. At the Tairua Heads they are finely laminated. On the sea-face there the laminæ are crumpled and plicated in the most intricate manner, giving the rock a strong resemblance to a highly contorted gneiss or schist. From evidence he collected during his official geological surveys of the Wanganui and King-country areas in 1885 and 1886, Mr. Park considers the rhyolites of Pliocene age.

Separate sections of the paper are devoted to a discussion of the facts relating to the "Most Favourable Country," "The Source of the Gold," "Shoots of Gold," "Form and Value of the Gold," and the "Associates of the Gold." Each subject is treated at considerable length, the author basing his conclusions on his own observations and the practical experience obtained in the mines for a number of years.

The second part is devoted to a detailed description of the characteristics of the principal goldfields in the peninsula, and is profusely illustrated with sections and diagrams. The rocks, gold-bearing veins, faults, and dislocations of the Thames, Coromandel, Waihi, and Kuaotunu Goldfields naturally claim the most attention, but the smaller goldfields, such as Te Aroha, Waitekauri, Karangahake, Whangamata, Neavesville, Tairua, Cabbage Bay, and Moehau, have each received due notice. The Thames goldfields afford the greatest scope for the researches of the geologist, and the author, following the lead of European and American authorities, has made it a typical or classical place for elucidating the facts relating to the general geology and structure of the peninsula. The geological structure of the Thames affords the key to the geology of all the goldfields, and hence the prominence it receives at the hands of the author. The geology of the Martha Lode at Waihi is very interesting reading, and is taken as typical of the Ohinemuri or Lower Thames goldfields. Kuaotunu is also described with minute detail as being typical of the Palæozoic gold-bearing areas. To attempt to summarise the mass of facts contained in the different sections dealing with these would, within a limited space, be impossible, and readers must therefore be referred to the work itself.

The concluding pages are devoted to the Great Barrier Island, the geology of which is almost identical with that of the Hauraki Peninsula. A striking feature of the Barrier goldfields is the enormous development of silicious sinter which crowns the White Cliffs Range. This deposit is nearly two miles long, and varies from 50 ft. to 700 ft. in thickness. The material is whitish-grey, often finely vesicular and banded with chalcedonic quartz. It contains layers possessing a very distinct oolitic or pisolitic structure, which is not unusual in deposits of this nature.

Mr. Park's interesting paper concludes as follows: "Briefly summarising the facts contained in the foregoing pages, we find there are two gold-bearing formations represented in the Hauraki Peninsula, the chief of which is the great andesitic formation. The close analogy existing between that formation and the rocks of the goldfields of the Western States of America has already been pointed out, and gives much reason for confidence in the future prosperity of these goldfields."

The New Zealand Institute of Mining Engineers are doing valuable work for the colony by publishing papers like Mr. Gordon's and Mr. Park's in pamphlet form. The typography, sectional drawings, and maps have been creditably executed at the *Evening Star* office, Auckland.

AURIFEROUS BEACHES ON THE WEST COAST.

[By Mr. Warden Macfarlane.]

THE sea-beaches on the west coast of New Zealand present features somewhat unique in gold-mining. Gold in immense quantities, intimately associated with magnetite—the "black sand" of the diggers—and other minerals, and the ordinary sea sand and shingle, has been found along a coast-line of about three hundred miles. With the exception of some small beaches at Gold Bluff, near the mouth of the Klamath River, on the coast of California, I am not aware of gold in quantity having been found under similar conditions.

Various theories have been put forth as to the source from whence this gold has been derived, and to account for its presence in such quantities along such an extensive coast-line; however, I think we have only to carefully note the geological and topographical features of the Middle Island as laid down by such authorities as Hector, Haast, Hutton, McKerrow, Mueller, and others, and keep our eyes open, to arrive at a reasonable conclusion both as to its derivation and final distribution along our shores.

Lying in close proximity to the sea, and following the trend of the coast, we find a belt of auriferous country extending from Cape Farewell to Martin's Bay. The western watershed of the great Southern Alps in cross-section shows an abrupt descent and short course to the sea. This mineral belt is cut into by all our large rivers and their innumerable tributary branches: these, acting in unison with the immense glaciers yet in existence on the Southern Alps, and the various atmospheric agencies, are carrying on the work of degradation and transportation with unceasing energy. High up in the gorges of these Alpine regions can be heard the everlasting thunder of nature's batteries, for ever at work pounding, crushing, grinding, and disintegrating the minerals that ultimately form the sand and shingle of our sea-beaches; and, in obedience to natural law, the work of attrition and transportation goes on with unvarying result.

Age after age has this work been going on. The river having delivered its freight to the sea, a new set of forces come into play—viz., that of wave and tidal action. As a rule, the set of the sea inshore on the coast is north-east: this carries the sand and shingle slowly but surely along the coast, building up the various beaches; occasionally a heavy northerly strips the beaches and carries the sand to sea and to the south-west; the wave-action and heavy drawback to be seen on most beaches still further reducing the particles of sand, shingle, and metal—hence the fineness of beach gold.

The black-sand leads on our beaches are due to a peculiar swinging motion of the tide—the digger applies the same method when trying a prospect on his shovel—acting on the shingle and sand in motion, whereby the comparatively light material is swept down with the drawback of the receding wave, and the gold and associated minerals, owing to their greater specific gravity, are left behind in a thin layer on the slope of the beach; this layer may not be more than ¼ in. thick, or it may be from 1 ft. to 5 ft. Just so long as the swinging and sorting motion goes on so will the deposit increase, until a change in the tidal action takes place, when the sand so laid down may be covered up with layers of grey sand and shingle, often 10 ft. and 15 ft. in thickness, thereby forming what are known as beach-leads; or the whole may be swept away by a single tide, leaving not a trace behind of either black sand or gold.

That the gold found on the beaches is primarily brought down by the rivers on the coast is a fact proved and known to gold-buyers, the quality of the gold on the beaches corresponding with that of the rivers in their neighbourhood.

Australia and North America, although great gold-producing countries, show no such auriferous beaches as there are in New Zealand; but this is entirely due to the different topographical features of the countries mentioned. In Australia the auriferous streams have been arrested and imprisoned in her great central plains, rarely reaching the present coast-line. In California the valley of the Sacramento (formerly an immense inland sea) has been the recipient of the golden treasures of the western slopes of the Sierra Nevadas and the eastern watershed of the coast range; whilst such rivers as the Colorado, the Arkansas, the Platte, and the Missouri, all draining auriferous country, have deposited their gold in the great central basin of the western plains; whereas the mineral treasures of the west coast of New Zealand have been, and are being, swept down from their source with such force that no permanent lodgment can be effected until the sea disposes of them along our shores. To utilise this great source of wealth so that it may benefit both the individual and the State is the problem to be solved.

Like all our goldfields, our beaches have passed through the usual experience—first, a great rush of eager diggers, with rich and quick returns from the surface and shallow workings; then came what may be called the California-pump era, also giving grand results. Then, as the water grew more troublesome, came the era of big races and water-wheels; but, not being able to master the water with their then appliances, claims were reluctantly abandoned, and finally, as far as systematic working was concerned, the beaches were abandoned. Many of the men connected with these big undertakings are still on the coast, and, having implicit faith in the capabilities of the beaches, would gladly avail themselves of any assured method of getting at the gold left in their old workings. Rich runs of gold were found above as well as below water-level, but it was only out of the former that the first diggers reaped such a rich harvest of gold; some of the richest runs found on the Five-mile and other beaches were too far under the water, and were never worked; consequently the gold is still there.

From a long and intimate knowledge and study of beach-deposits and workings on the coast, I have come to the conclusion that, with proper appliances, more gold will be obtained (and at far less cost) than was taken by the first workers, even if only worked to the depth of the known runs of gold; but, beyond all this, I hope to be able to demonstrate that, at lower levels than has ever been reached on our beaches, runs of gold quite as rich as those already touched will be got. And, in support of the position I have taken, I would point out that all along the West Coast we are confronted with evidence that cannot be gainsaid of this fact: that stability is far from being the normal condition of the Island. In the first place, we have positive evidence of upheaval presented to us in the fossiliferous beds and the remains of raised black-sand beaches found at various points along the coast, notably so at Addison's Flat, Charleston, and Brighton, south of the Buller; Darkie's Terrace, north of the Grey; the Waimea and Hauhau, north of Hokitika; and Sardine Terrace, near Arnot's Point: all from 200 ft. to 500 ft. above present sea-level. Again, we have equally strong proofs of subsidence.

Professor Hutton, F.G.S., writing on the "Causes of the Former Great Extension of Glaciers in New Zealand," argues that the glaciers that filled our valleys in former times were due to an elevation of the land some 3,000 ft. to 4,000 ft. above the present levels, and not to climatic or geographical changes. If this contention is borne out, then we have had a period of subsidence reaching down to the present day, during which our glaciers have shrunk in proportion to the rate of subsidence, leaving all along the coast immense moraines as proof of their presence and evidence of the work done by them in former times. Whether this subsidence has been the result of abrupt transitions or of gradual downward movement it is difficult to say. However, during comparatively recent times evidence points to a gradual sinking.

In support of this I would instance the dip and disposition of the strata in Ross Flat, as shown in section of main shaft, Ross United Gold-mining Company (see "Handbook of New Zealand Mines"). At 380 ft. we find the various layers resting on what is termed terrace-bottom. This terrace or "old-man" bottom, so named by the miners, is of doubtful derivation, and overlies the marine tertiaries so much in evidence on the West Coast; but neither in this terrace-bottom nor in the overlying 380 ft. of drifts has a single marine shell or fossil been found, although the bottom reached is close on 300 ft. below present sea-level. From the dip and regularity of the strata it would appear as if the subsidence had been gradual, and that the different layers had been superimposed on each other in keeping with the rate of subsidence. Again, at the workings on the Five-mile Beach a turf bottom was reached. Under this turf bottom beach shingle and sand, with gold, was found, but unworkable with their then appliances, owing to the body of water met with. Indisputable proofs of gradual subsidence are in evidence on the coast-line, where, south of the Mikonui, most of the bluffs and headlands are composed of the remains of terminal and the ends of lateral moraines. In places only small sections of the terminals are left standing, while the magnitude of the original mass is indicated by immense boulders or erratics a considerable distance out to sea, and awash at low water. The sea-face of all the bluffs shows a vertical section, due to the continued aggressive action of the sea.

Whether this alternate elevation and depression is uniform on both sides of the Island, or whether, as some think, an oscillatory movement is going on, the east coast rising in proportion to the rate of subsidence on the west coast, it is hard to determine. We might possibly get reliable data if the angle of incidence of the old beach-leads were noted and compared with the angle of our present beaches. However, be that as it may, there is sufficient proof that subsidence has taken place, and is still going on. This being granted, our beach deposits must correspond in depth with such subsidence, and, as the same everlasting agencies have been at work for untold ages, grinding and pounding the mineral matrices, and the same, if not greater, rivers have been bringing down and sorting this never-failing stream of ground-up material to be dealt with by the same restless sea, so the same sequence of black and grey sand, shingle, and boulders must have followed in regular succession the gradual subsidence of the land; hence the likelihood of payable gold existing at lower levels.

If the conclusions I have drawn from carefully-observed facts and reliable data are correct, it follows that, with improved appliances and with three hundred miles of beaches to operate on, the result cannot be otherwise than satisfactory. From a financial point of view the re-working of our beaches by suitable machinery should commend itself to co-operative bodies of miners as well as to capitalists, or, better, to both combined. Under capable management, and with proper appliances for saving the fine gold, a profitable outcome is pretty well assured. Although for years the beaches have been practically abandoned, my faith in their value has remained unbroken, knowing well that, sooner or later, the inventive genius of our age will furnish the means of getting at the treasures buried in our beaches, and when found it only remains for the miner and the capitalist to apply them to their own advantage, and in so doing to the advantage and good of the colony.

PUBLICATIONS RECEIVED.

"The Geology and Veins of the Hauraki Goldfield of New Zealand," with coloured maps and sections, by James Park, F.G.S. From the New Zealand Institute of Mining Engineers.

"The Mining Industry of New South Wales," by J. Whear Roberts, Mining Editor, *Daily Telegraph*, Sydney. From the author.

"The New Zealand Official Year-book, 1897," by E. J. von Dadelszen, Registrar-General.

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THE
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[Issued by the Mining Bureau of the Mines Department, New Zealand under the authority of the Hon. A. J. Cadman, Minister of Mines.]

NOTES AND COMMENTS.

The total quantity of gold exported during the month of October was 29,459 oz., valued at £116,036, as compared with 14,279 oz., valued at £56,106, for the month of September. As was surmised in the last issue of the *Record*, the gold had been held back during the past two months, as only 629 oz. had been sent away during the months of August and September, while the export for October was 12,708 oz. The following are the returns from the under-mentioned ports:—

	Quantity. Oz.	Value. £
Auckland	8,104	30,151
Westport	925	3,700
Greymouth	6,025	24,102
Hokitika	1,337	5,348
Dunedin	12,708	51,295
Invercargill	360	1,440
Totals for October	29,459	116,036
Totals for ten months	219,346	858,523

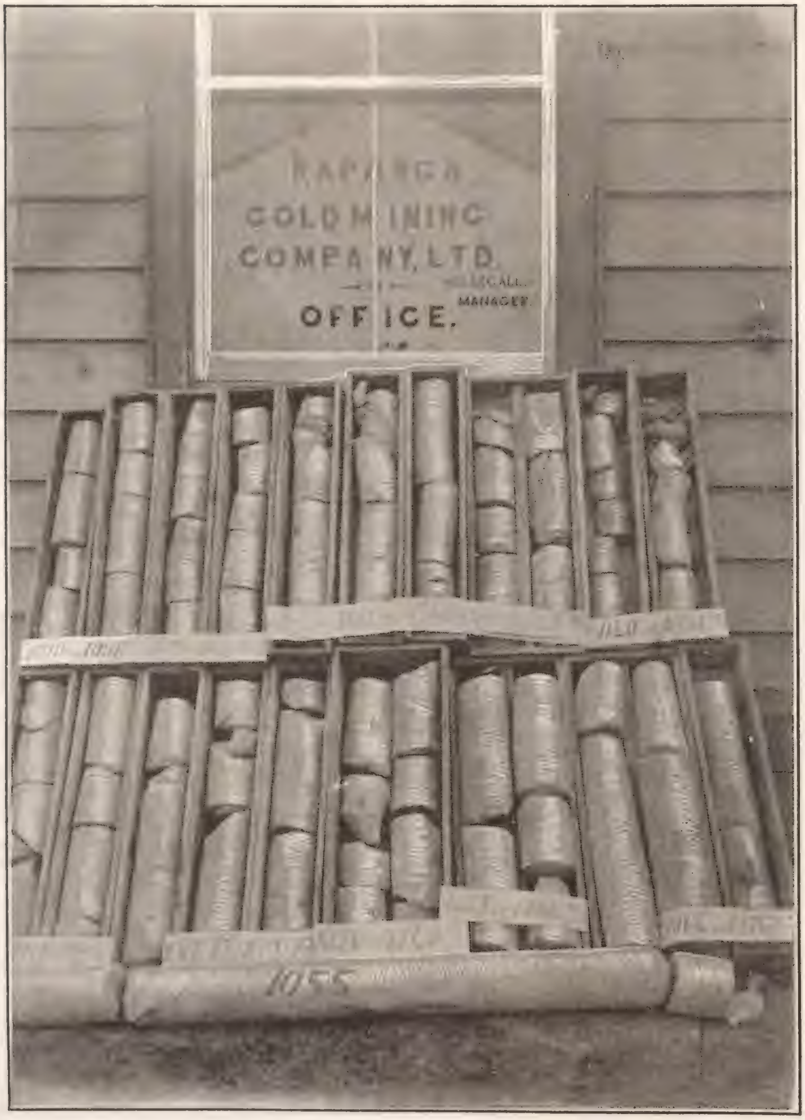
Auckland also exported during the past ten months 143,887 oz. of silver, valued at £16,415; the quantity shipped last month being 10,300 oz., valued at £1,245.

Some interesting returns will be found in the present issue as to the quantity and value of gold received for coinage at the Melbourne branch of the Royal Mint from 1872 to 1896, and the regulations adopted by the Sydney and Melbourne branches of the Royal Mint. During the past two years the Melbourne branch showed a profit of £497 12s. 7d. and £2,049 19s. 4d., but up to 1895 the minting of gold was carried on at a loss, and overtures have been made from time to time to the Royal Mint to permit the coinage of silver, on which there is a considerable profit. It will be remembered that about seven years ago, in consequence of the complaints frequently made to the New Zealand Government that a fair price was not given by the banks for the gold, five samples of about 12 oz. each were obtained from Reefton and Kumara, on the west coast of the South Island; from the Island Block Company's claim, Clutha Valley, Otago; Mr. Leijon's dredging claim, Alexandra; and from St. Bathan's, Otago, and forwarded to the Sydney Mint. The returns furnished by the Deputy-Master of the Mint showed that the gold from Reefton was worth £4 2s. 10¾d. per ounce; from Kumara, £4 1s. 4⅛d. per ounce; from Island Block, £4 1s. 7⅝d. per ounce; from Alexandra, £4 0s. 11⅞d. per ounce; and from St. Bathan's, £4 2s. 7¼d. per ounce. The whole of the samples were above the standard value, the Reefton gold being highest with 1·424 carats, and Alexandra lowest with 0·860 carats, over the standard of 22 carats. The expense of forwarding the gold to Sydney, including mint charges, amounted to 1s. 6d. per ounce. The freight on the small quantity sent across, which was the heaviest item in the expense incurred, would have been no more had the quantity been 500 oz.; and as each parcel had to be assayed separately in order to ascertain its value, therefore the expense in connection with forwarding the gold to the Sydney Mint was far in excess of what it would be if large parcels were sent. The following table, laid on the table of the House of Representatives in 1891 by the Hon. the Minister of Mines, furnishes full particulars:—

Place from where Gold was sent.	Weight of Gold as taken at Colonial Laboratory.	Weight of Gold received at Sydney Mint.	Weight of Gold after Melting.	Loss of Gold in Melting.	Assay Report: Decimal.		Fineness of Gold.
					Gold.	Silver.	
	Oz. dwt. gr.	Oz.	Oz.	Oz.			Carats.
Kumara ..	11 19 21	11·99	11·84	0·15	0·9570	0·035	22·968
Island Block ..	12 0 14	12·04	11·50	0·54	0·9605	0·030	23·052
St. Bathan's ..	11 19 21	11·99	11·72	0·27	0·9730	0·020	23·332
Alexandra ..	12 0 5	12·01	11·79	0·22	0·9525	0·040	22·860
Reefton ..	12 0 20	12·04	11·77	0·27	0·9760	0·015	23·424
Totals ..	60 1 9	60·07	58·62	1·45	..	..	..

Place from where Gold was sent.	Standard Gold.	Mint Value per Ounce.	Value at Sydney Mint.	Mint Charges.	Net Value after deducting Mint Charges.	Purchase-money.
	Oz.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Kumara ..	12·361	4 1 4⅛	48 3 2	0 5 2	47 18 0	46 17 0
Island Block ..	12·050	4 1 7⅝	46 18 10	0 5 0	46 13 10	46 8 6
St. Bathan's ..	12·440	4 2 7¼	48 8 9	0 5 2	48 3 7	48 0 0
Alexandra ..	12·251	4 0 11⅞	47 14 11	0 5 1	47 9 10	46 4 0
Reefton ..	12 532	4 2 10¾	48 15 1	0 5 3	48 9 10	47 6 9
Totals ..	61·634	..	240 0 9	1 5 8	238 15 1	234 16 3

Note.—Expenses: Freight, £2 2s.; insurance, 18s. 3d.; incidental, 2s.; purchase-money, £234 16s. 3d.: total, £237 18s. 6d.



Cores from Bores below 1,000 ft., Kapanga Mine, Coromandel.

From Photo. by E. T. Kennedy.

Protection is frequently asked for and granted to permit the flotation of mining properties on the English market. As refunds of the deposits lodged with the applications have been asked for in some instances, the general question of refunds has been taken into consideration by the Hon. the Minister of Mines. The object of requiring deposits is to insure that the intentions of the applicants for protection are of a *bonâ fide* character, and the Warden has been requested to make a specific recommendation in each case. Something beyond the want of vitality in the English market is necessary as an excuse for a refund of deposits, as the dulness of the market is well known to the vendors when they apply for protection to enable them to make arrangements for floating companies in the United Kingdom to work their claims. In future a sworn affidavit, setting forth the whole of the steps taken to insure the floating of a company to work the claim, the names of the persons through whom the business was to be carried out, and a clear statement showing the reasons for non-success, must be lodged with the Warden when an application for a refund is made. This will tend to place a check on those who apply for protection on the pretence of wanting to float their claims into companies, but who very frequently have no intention whatever of doing so, and when the time expires ask for renewed protection or the return of their deposits.

A question arose lately at the sitting of the Warden's Court, Thames, on an application for protection. It appeared that the applicant had received one period of six months' absolute protection, followed by a permission to work with fewer men than required by regulations, at the termination of which he had received a further period of four months' absolute protection, and on the expiry of that, a further permission to work with two men for four months. He now applied for a third period of four months' absolute protection. It was contended for the applicant that he had complied with paragraph 2 of section 79 of the Act, as the working of a claim with the number allowed by the Warden was a compliance with that section of the Act. The Warden said he thought, when the Legislature made use of the words "after an interval of not less than three months after the expiry of the period of protection first granted by the Warden, but not before, and then only on the condition that mining operations have been regularly and continuously carried on during the whole term of such interval," that it intended that every claim should be worked by the full complement of men for at least three months. No doubt section 7 subsection (3) gave power to work with a lesser number of men than the regulations required; yet it seemed to him that doing so was not altogether what the Legislature meditated when it used the words "regularly and continuously." Those words seemed to imply that the mine should be worked with the full complement of men during the interval of three months before any more absolute protection should be granted. However, as the applicant in the present case represented a syndicate which had expended very large sums in developing various properties on the field, and employed a large number of men, he would not refuse the application, which would be granted for what it was worth, as there seemed some doubt as to the power to grant it. Probably, on some future occasion, the point would be fully argued; in the meantime, his object was to draw attention to the wording of the section referred to, to enable those interested to look into it and satisfy themselves on the point.

The speech delivered by Mr. Thomas Russell, C.M.G., at the meeting of shareholders of the Waihi Gold-mining Company held recently in London, and reproduced in the present issue of the *Record*, together with Mr. John McCombie's interesting sketch of the early discovery of the mine, which was published last month, gives a pretty complete and accurate history of the leading mine in the colony, and should teach superficial observers a useful lesson. Writers like the "Wandering Correspondent" of the *Financial Times* might very advantageously read Mr. McCombie's sketch and Mr. Russell's speech. It would be singular indeed if in such a large area of auriferous country as the Cape Colville Peninsula embraces there should not be many other mines equally successful. The best-informed men at Coromandel, the Thames, and Ohinemuri, who have shared in the successes and failures of these goldfields during the past thirty years, entertain very little doubt that such will be the case, and they are backed up in their opinion by practical mining engineers who have gained their knowledge in many quarters of the world.

In last issue a report on the diamond-drill boring operations below the 1,000 ft. level at the Kapanga Mine, Coromandel (the deepest mine in the colony) was published. The photograph of the cores, which is given to-day, arrived too late for reproduction last month. The cores have been taken from the following depths :—

1,000 ft. to 1,012 ft.
1,012 ft. „ 1,020 ft.
1,020 ft. „ 1,040 ft.
1,040 ft. „ 1,055 ft.
1,055 ft. „ 1,064 ft.
1,064 ft. to 1,070 ft.
1,070 ft. „ 1,096 ft.
1,096 ft. „ 1,114 ft.
1,114 ft. „ 1,140 ft.
1,140 ft. „ 1,160 ft.

DOUBTS frequently exist as to the procedure to be allowed in prospecting for minerals on lands that are situated outside mining districts; and it may, therefore, be as well to state, for the information of prospectors, that applications for prospecting licenses on lands beyond the boundaries of a mining district should be made to the Commissioner of Crown Lands in whose district the land is situated, showing the boundaries, and giving all necessary information, so as to enable the Commissioner to properly define the boundaries of the areas to be prospected. All applications for prospecting licenses must be accompanied by a fee of £1.

WHEN the Sunday Labour in Mines Prevention Bill was in Committee some alterations were made. Clause 3 of the Bill, as reported to the House, now provides that *no* Inspector of Mines shall give authority to work "except in cases where he is satisfied that the labour cannot be suspended on Sunday without risk or injury to the mine or its operations; and, when giving such authority, he shall in each case state in writing his reasons for granting such authority, and shall specify the number of workmen that may be employed, and the nature of their employment, and the period during which such authority shall extend." The following new clause was added: "There shall be the right of appeal to the Warden of the mining district from the decision of any Inspector of Mines in respect of the granting or refusing of an authority under sections 2 or 3 of this Act." The penalty is altered from £1 to £5; but in the proviso the words "defendant satisfies" were struck out, and the Court "is satisfied" substituted. Another new clause was added, providing that the Act shall come into operation on the 1st January, 1898.

MR. A. MCKAY, Government Geologist, accompanied by Mr. G. Wilson, Inspecting Engineer, recently visited the Wairarapa district for the purpose of examining the different localities at which indications of coal have been discovered. On the 2nd instant they examined the locality at the eastern base of the front hills of the Tararua Range, opposite Dalefield, and made arrangements to visit the localities on the banks of the Waingawa the following day; but heavy rains and the melting of the snow on the back ranges so flooded the rivers that the coaly outcrops could not be examined. In consequence, they went on to Mauriceville, and made an examination of the calcareous deposits worked for lime at that place. At Dalefield the prospecting works are being carried on in a convenient situation for the carriage of coal to the main line from Wellington to Masterton; but unfortunately there are no indications whatever of the existence of a workable seam at the locality where prospecting is being carried on. The rocks yielding traces of coal consist of thin-bedded grey sandstones and dark drossy crushed shales, in which occur small nests of coal, the quality of which, free from earthy matter, is excellent. These indications of coal are to be met with everywhere from the southern end of the Rimutaka Range, on Cook Strait, along the mountain region to the northern boundary of the Wellington Provincial District; but nowhere have seams of coal, more than a few inches thick, been found, and they seldom extend in strike or dip more than a few feet. At the locality on this occasion visited, from a shaft sunk near the bank of the creek in which some traces of coal were found, a nest of lustrous but much-crushed coal was found, and samples sent to the Colonial Laboratory proved to be of a bituminous character, and otherwise a coal of high quality. The first shaft proving faulty, a second, some 20 ft. more to the north-west, has been put down, and at the time of the visit of inspection, had been sunk to a depth of 38 ft. without giving any indications of a coal seam, and but very little of carbonaceous matter in any form. The strata in the neighbouring hills and along the banks of the creek is everywhere inclined at a considerable angle, and the sectional exposures are sufficient to reveal the presence of coal did such in anything like a workable seam exist at the place being prospected, or in that neighbourhood. The concluding paragraph of the report is as follows: "We have seldom seen prospecting, having a specific object in view, carried on with less chance of effecting the purpose for which the works might be undertaken."

AT a recent sitting of the Warden's Court at Paeroa (Ohinemuri), one or two points of interest to the mining community cropped up. In one instance a declaration was read in support of an application to work a special claim with two men for four months, which set out that the claim had been worked with two men during the previous four months under permission. It, however, appeared that the previous concession was to work with six men. The Warden drew counsel's attention to the discrepancy between the declaration and the record, whereupon counsel asked for an adjournment. The Warden stated, if an adjournment were granted, he would require the production of the pay-sheets for the past four months. After a short discussion the Warden refused to grant permission.——In another case, a person applied for the same piece of ground which had been previously granted to him, but the license for which the applicant did not take up or pay the first half-year's rent within the time required by the Act; hence the license lapsed. The Warden said he did not intend to allow applicants to lock up land in this manner. It was merely a way out of paying rent. In this instance the applicant had actually applied for the land two days after the license lapsed. He would not re-grant the same land to the same applicant or party under such circumstances. Applicant's counsel, however, explained that the reason for the license not being taken up was the illness of the applicant through typhoid fever, and that the original grant had been made in his name in error. It was for the purpose of rectifying this that the application had to be renewed. After the explanation the grant was allowed to go in the name of the person for whom the applicant acted.——The Warden also drew attention to the declarations forwarded by legal managers in which they asked for permission to work with one man instead of the regulation number for a period of four months, pointing out that it would be better for them to state openly what they asked for—viz., one man to shepherd the ground instead of one man to work, for that was what it really amounted to, as working under such conditions was simply out of the question, and could be of no use on a quartz-mine.

Mr. Frank White, silversmith, Christchurch, has taken out a patent for an improved process for saving gold from refractory ores, and claims that it is a far superior, cheaper, and more easily worked process than cyanide; that it will act in place of cyanide, besides extracting gold where cyanide fails; and that, before purchasing the Cassel's cyanide process, inquiries should be made into other processes, and public trials made. In the patent specification it is stated that the crushed material is "placed in a wooden vat, and a solution in water of ½ per cent. of ammonia of 880 specific gravity, and ½ per cent. of sulphuric acid is added. The mixture is allowed to stand for a period of from twelve to thirty-six hours, according to the percentage of sulphur contained in combination with base metals, minerals, and other waste matters in the ore." The patent having been brought under the notice of the Hon. the Minister of Mines, the Government Analyst was requested to report upon it. He stated that no chemist fairly acquainted with his science and the various chemicals and patents that are used for the extraction of gold from its matrices would for one moment entertain the idea that a mixture of sulphuric acid and ammonia, in any proportion to each other, and in any proportion to gold or auriferous material, can ever be an effective or profitable solvent for such gold, whether the metal is free or combined as in nature. The Government Analyst therefore suggested that Mr. White should be requested to give a return of his results for the treatment of auriferous stuff, or even pure gold, by his process, and to state the composition of his mixture as prepared for use. Mr. White was accordingly communicated with, and in reply stated: "I got on an average from 2 oz. to the ton by my last test, and on former tests have got from 12 oz. to 15 oz. to the ton." In a second report the Government Analyst stated that he thought the process could not have a general or even a large application. It would have a special application to gold covered with iron oxides, such as that of the West Coast cements, but muriatic acid should, he thought, be a better application. Mr. White has been informed that, as his invention would not supersede the cyanide process, the question of the acquisition by the Government of the patent rights of the Cassel Company in the cyanide process would not be affected thereby.

At a general meeting of shareholders of the New Zealand Mines Trust (Limited) held in London on the 2nd September, the chairman, Mr. Thomas Russell, C.M.G., in the course of his speech said: "The largest and most important of our shareholding interests are as follows: In New Zealand we hold shares in the Waihi, Waitekauri, Crown, and Woodstock Gold-mining Companies, the old Kapai-Vermont Company, and the Ohinemuri Syndicate; in West Australia we hold shares in the Lady Charlotte Gold-mines, the North Kalgurli Gold-mining Company, the Weld-Hercules Gold-mining Company, and some other shares to which we attach no special value. We also hold a large interest in the North Mount Charlotte Gold-mining Company. We have been opening up this property, but as yet with unsatisfactory results. In New South Wales we have a large holding of shares in the Howell's Consolidated Gold-mines, an undertaking of which I have a very high opinion; and some other small holdings of shares in New South Wales mines. Bearing upon this question, I may tell you that quite three-fourths of the shares in the New Zealand Mines Trust are held by the directors and their friends, and, as far as I know, the directors have never sold shares, but have largely increased their holdings, including a considerable part of the recent new issue. From this you will see how deeply we are interested in results. If the company loses a shilling, the directors and their friends lose ninepence of it." In the course of his address Mr. Russell stated that the New Zealand Mines Trust had purchased during the year a large property in Mexico, consisting of an area of upwards of 250,000 acres, which he described "as a fine agricultural and pastoral estate, flanked on both sides by high ranges, which are reputed to be mineral. . . . . The estate has been vested in the Durango Estates Company (Limited), the whole of the shares of which are held by the New Zealand Mines Trust. . . . It was brought to our notice by Mr. Read, now our agent at Coolgardie." On the motion of the chairman a dividend of 1s. per share, free of income-tax, was declared. This, he explained, though nominally only 5 per cent. on the 200,000 £1 shares in the company, yet really worked out to 10 per cent. to those who took up shares recently.

Mr. W. Fraser, M.H.R., forwarded a petition to the Hon. the Minister of Mines from Alfred Smith and other miners at Skipper's Point, Otago, drawing attention to Mr. Smith's invention for working river claims, and asking for some reward, as he was unable to take out a patent, having permitted other parties to use his invention for some time. Mr. Fraser stated that Mr. Smith's method of working had been largely adopted, and ground worked to advantage which had formerly been abandoned. The petition and a plan of the invention were submitted to the Inspecting Engineer, who reported : "The plant for raising gravel by suction on this principle is simpler and less costly than the ordinary system of elevating by pressure. It appears to be effectual in shallow ground, and might also be applied to dredging. However, until sufficient data as to head of water, size of nozzle, &c., are given, comparison between the relative efficiency of this and the elevating system cannot be obtained. Although Messrs. Smith may have been the first to apply the direct jet to produce a vacuum in this way, it is questionable whether, until it becomes more extensively used, the first adoption of this method is a matter for grant of money or reward from Government. On my next visit to Otago I shall make a careful examination of the plant, and report on its application." Mr. Fraser has been informed to that effect.

Mr. C. J. E. Linnemann, Hokitika, who claims to have thought out a simple, effectual contrivance by which much of the fine gold from the gold-bearing sands of rivers, creeks, and sea-beaches can be easily collected, has written to the department, asking what protection or remuneration the Government of New Zealand are prepared to give him if all he claims for his method turns out to be correct. He further states that "it can be used by anybody in a large or small way, and can so easily be worked that it will give employment to many old men who would not be able to do manual labour: children could work it, and it is very inexpensive. A patent would be out of the question : it would be impossible to keep control of the contrivance if once known." Mr. Linnemann has been informed that the only way in which his invention can be protected is by taking out a patent in the ordinary manner.

In compliance with a request from the Hon. the Minister of Mines, a complete specification of the testing plants provided by the Mines Department to test prospectors' quartz in the mountainous districts on the Victorian goldfields, has been forwarded by Mr. J. Travis, Secretary for Mines and Water-supply. The batteries consist of three heads and all necessary appliances, the contract price being £156. Eight of these batteries have been ordered, four are now erected on the selected sites, and the others will be finished shortly. Three 4-horse-power portable engines, costing £175 each, and one 6-horse-power oil-engine, which cost £150, are driving the four batteries ; the other batteries will be driven by four colonial-made 4-horse-power portable engines, costing £199 each. The contractor has to erect the battery complete in his yard, paint it, mark all parts, take it down, pack it in boxes, and deliver it to any railway-station in Melbourne.

A communication has been forwarded by Mr. Gilfedder, M.H.R., from a large number of miners, farmers, and business people at Orepuki, praying the Government to reserve for mining purposes sections 6, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19, Block II., Longwood Survey District, for mining purposes. The petitioners state that not only have these lands been prospected and payable gold found thereon, but the natural outlet of the Orepuki and Longwood Goldfields lies through the sections before mentioned, as can be proved by geological survey. A reply has been forwarded to the honourable member for Wallace, stating that, in terms of the provisions of section 213 of "The Mining Act, 1891," every petition for the resumption of land must be accompanied by a deposit of £25, and on receipt of the deposit the application would be forwarded to the Warden, as required by the Act, in order that he might signify his approval if he considered it desirable that the land should be resumed.

An application has been received from Edgar Ward and party, Riverton, asking for assistance to enable them to continue prospecting a reef which they have discovered running through South Riverton, and which they have traced for some distance. They sank a prospecting shaft 60 ft. deep on the south side of the reef: the first 20 ft. was comparatively easy, but the remaining 40 ft. had to be blasted out. An intimation has been forwarded to the applicants that assistance can only be granted by the department upon the adoption of the amended regulations under "The Mining Act, 1891," by some Miners' Association, County Council, or Road Board. In the case of a Miners' Association, it should be stated, when making the application, that the regulations have been adopted. Information should also be furnished as to the amount of money in hand and to be collected, the names of the officers who are to operate on the bank account, and the name of the bank at which the account is to be kept.

The Greenstone Miners' Association applied, on behalf of John Dickson and party, for a subsidy towards sinking a shaft in Hohonu Flat, which they stated is "about four miles from nearest mining, and is a most likely place for gold." The shaft would be sunk to a depth of 90 ft. or 100 ft., and as the ground was likely to be very stony and wet, the shaft would require to be slabbed. A report has been received from an officer of the department to the effect that this would be the first shaft sunk to any depth in that locality, and would test a large area of country, ten or twelve miles in length by five miles in breadth; but it would be advisable to have the shaft sunk and timbered not less than 6 ft. x 3 ft., inside measurement, the shaft to be centred. If this were done, they could more readily cope with a large influx of water. A subsidy has been granted by the department on the following sliding scale: 3s. per foot for the first 15 ft.; 15 ft. to 60 ft., 7s. per foot; and 60 ft. to 100 ft., 9s. per foot.

The sales of water from the Kumara water-race during the month of August amounted to £266 15s. 6d.; Waimea, £70 17s. 6d.; Callaghan's, £6 5s. Expenditure for management, maintenance, and contingencies: Kumara, £161 1s. 6d; Waimea, £49 4s. 2d.; Callaghan's, £10. Number of men supplied: Kumara, 71; Waimea, 51; Callaghan's, 6. Gold obtained: Kumara, 445 oz.; Waimea, 222 oz.; Callaghan's, 20 oz. Average weekly earnings per man, after deducting amount paid for water: Kumara, £1 19s. 9d.; Waimea and Callaghan's, £1 9s. 10d. Sluicing has not yet been tried on a large scale at Callaghan's, but a new party are making preparations for more extensive working, and, if successful, other parties will probably be induced to take up and work ground in that locality.

Prospecting licenses have been granted to John Clouston and Winiata Te Whaaro, Taihape, to prospect for gold and other minerals in the Ruahine Ranges, in that part of the Awarua Block known as Subdivisions 1B, 1C, and 1D, Wellington Land District; to James Thomson, Auckland (for petroleum), for allotment 52, Block VII., Waiheke Survey District, Waiheke Island, Auckland; to D. J. Price, Christchurch, for the Auckland and Mount Peel Survey Districts, Canterbury; to G. W. Basley (for petroleum), on Section 6, Block III., Paeroa Survey District, Auckland; to C. Pilliet, D. Johnston, and J. Johnston, on 250 acres in the Waimea Survey District, Nelson.

Mr. J. C. R. Isherwood, of Palmerston North, has written to the department, stating that he intends to prospect for minerals on the Tararua Ranges, near the Manawatu Gorge, and requesting information as to whether it is necessary to obtain a prospecting license. Mr. Isherwood has been informed that application for a prospecting license should be made to the Commissioner of Crown Lands at Wellington, and that a fee of £1 should be forwarded with the application.

The Westland County Council having made a request for a grant for the purpose of widening the track from Kanieri Lake to Milltown into a dray-road, which they stated will be immediately required in connection with the proposed works at Humphrey's Gully, the route being the best one available for reaching the upper end of the line, and that £300 authorised for widening the further end of the Milltown track should be transferred to the present work, so as to thoroughly complete it, a transfer of the item has been sanctioned, making a total amount of £600 available for the work.

The Maniototo County Council have arranged with the County Engineer, Mr. Richard H. Browne, C.E., to supervise the sinking of bore-holes to test the bottom at the site of the proposed Ewcburn Dam, and to furnish a detailed report on the nature of the strata sunk through, and the depth of bed-rock for foundation of dam. The cost of the work will be borne by the Mines Department, and payments made on the certificate of the Chairman and the County Engineer. Mr. Browne estimates that an expenditure of about £140 will be entailed for the necessary material and labour required.

A communication has been received from Mr. Walter Tiley, Cromwell, requesting the Hon. the Minister of Mines not to grant protection to the Hartley and Riley Dredging Company, on the ground that no work of any kind has yet been done, and not a single load of material has been deposited on the ground. Mr. Tiley has been informed that six months' protection had been granted to the Hartley and Riley Dredging Company before the receipt of his communication, and that the Minister of Mines was unable to interfere in any proceedings pending before the Warden's Court in respect to the action taken against Mr. Tiley for trespass.

The over-capitalisation of mining properties has been referred to on several occasions in the New Zealand Parliament by the Hon. the Minister of Mines, also in the annual reports of the Inspecting Engineers for this colony. In Victoria, too, it has been found necessary to draw attention to the same pernicious system. Here is an extract from the last annual report of the Under-Secretary for Mines in that colony:—

> The list compiled by Mr. Edward Ashmead shown that the number of companies floated in England is 1896 to work mines in Victoria does not exceed fifteen in all, the aggregate nominal capital of which amounts to £1,627,000, and with one exception the shares are placed at a "standard" value of £1 each; the average capital of each company may be regarded as being a little over £100,000. In contradiction to this, I may point out that, taking at random twenty mining companies floated successfully in Victoria at periods extending over several years, the average capital is about £34,000; and in taking twenty companies floated here during the twelve months under review, I find that the average capital is about £35,000. If, therefore, a capital of from £30,000 to £40,000 is found ample to equip and successfully work a mine floated in Victoria, the question naturally arises why companies floated in England should require a capital of nearly three times that amount. The answer to this question at once explains the difficulty that exists, and probably will continue to exist, with respect to successful flotation of mining property in England—viz., over-capitalisation. It is quite reasonable to assume that a mine may pay fair dividends on a working capital of £40,000, used solely for developing such mine, but would inevitably be a failure on a capital of £100,000, £60,000 of which passed into the hands of the brokers as commission for floating the company. When the English capitalists recognise the force of this assumption, and act on it, they will find that the Victorian goldfields afford almost unlimited scope for profitable investment.

The following extract from the report of the special commissioner sent by the *San Francisco Examiner* to the Klondyke Goldfields conveys a timely warning to those who may have an idea of trying their fortunes in the Arctic regions: "Of the thousands of misguided men, and, alas! women and children, who are now within the bounds of the great northern gold belt, there is a fate in store during the coming months of the sunless winter that is nothing less than horrible. The gaunt spectre of starvation stalks through that frozen land, and ere spring brings relief to them many will have found their graves beneath the moss that covers the golden fleece which they were in search of. Murder will be done; and, unless all signs fail, the survival will be for the fittest. Those who are physically strong and those who have wealth at their command will survive. The poor in body and the poor in purse will find that which, I am afraid, will make up the chapters of a story such as the world will shudder to hear."

During the month of October 57 steamers and 5 sailing vessels, representing 20,662 tons register, entered the Port of Westport, and 58 steamers and 3 sailing vessels, representing 20,060 tons register, left the port—making a total tonnage of 40,722 tons. The American barquentine, "Gleaner," was loading at the beginning of November for Orange County, California, and the American barquentine, "Arago," for Honolulu. The average depth of the bar for

October was 24 ft. 4 in., and the average depth in the river 18 ft. 9 in.

THE Westport Coal Company's output for the month of October was 17,256 tons; Westport-Cardiff Coal Company, 4,413 tons—making a total of 21,669 tons. Of this quantity 1,503 tons were shipped to Sydney direct for the naval squadron. The small output for the month of October is attributable to the very exceptional bad weather which prevailed for some weeks.

DURING the month of October the exports from the Port of Greymouth included 9,251 tons of coal, 5,445 sleepers, and 759,317 superficial feet of timber.

ANALYSES made at the Thames School of mines, under Mr. F. B. Allen's direction, of two 50 lb. parcels of copper from Whangaroa showed 11 per cent. of ore in one sample and 3½ per cent. in the other. The bulk of the ore was iron pyrites, but as the samples were taken from the cap of the ore body better results may be obtained on opening up the deposit.

THE *Grey River Argus* of the 22nd ultimo stated that "the members of the Borough Council were justly indignant at receiving such a letter as they did from the Mines Department in reply to their request that some means should be taken to protect the town from floods." No such letter has been sent by the Mines Department to the Greymouth Borough Council.

MR. O'REGAN, M.H.R., has forwarded a number of amendments in the Coal-mines Act suggested by the Denniston Coal-miners' Union. The honourable member for the Buller has been informed that it is not the intention of the Government to introduce any legislation in respect to coal-mines this session.

MR. REGINALD MURRAY, late Government Geologist, Victoria, is at present on a visit to this colony. He left Wellington last week for Nelson, accompanied by Mr. A. McKay, Government Geologist, Professor Black, Dr. Storer, and Mr. Daniells.

A VERY notable change has taken place in the Eastern coal-trade. Japan, which was one of the most formidable competitors of Newcastle, seems to have withdrawn altogether, so far as the export trade is concerned, the Government having limited the output of the local mines, in order, presumably, to conserve the coal for home-manufacturing purposes. Mr. T. Tanaka, the Hongkong representative of the Mitsui Busson Kaisha, has lately been visiting Newcastle for the purpose of arranging for regular shipments of coal from that port to Japan. He states that the annual output of the Japanese collieries has reached 2,500,000 tons, but, owing to the action of the Government, it will in future be necessary to import large shipments from Australia. The output of the mines belonging to the company in question is 800,000 tons per annum, whilst the same corporation practically controls other collieries, the output of which totals 500,000 tons. It will be a welcome development to Newcastle if this attitude of abstention is maintained. There are quite enough competitors without Japan.—*Journal of Commerce* (Melbourne).

THE Union s.s. "Pukaki" was announced to bring 1,000 tons of Westport (N.Z.) coal to Sydney, thus entirely reversing the usual course of trade. The explanation of the anomaly is that New Zealand coal is highly thought of by naval authorities, and they desired to have some experiments made with it in comparison with Australian coal. It is not at all improbable that, amongst other things, the authorities will use this particular coal in testing the steaming qualities of the warships over a measured mile. The Westport coal has always been highly spoken of, and its steaming qualities were forcibly demonstrated at Samoa, in 1889, when H.M.S. "Calliope," using this coal, made an ever-memorable escape from the port of Apia in a terrific hurricane. In the same storm several American and German warships were totally wrecked.—*Australian Mining Standard.*

"CITY MAN," in a notice of Skinner's "Mining Manual" in the *British–Australasian,* waxes facetious over the "Dictionary of Mining Terms," at the end of the work:—"'Gad!' if I had £1,000 and nothing to do, whether I would not take 'kindly' to a 'horse,' 'jump' him over a 'gully' into a 'grass' 'paddock,' put on my 'pipe,' and turn 'prospector' on the chance of coming upon some big 'nugget' or 'outcrop.' And what if I should discover a 'Bonanza?' Then I should not be long in airing my superficial knowledge about 'crosscuts,' 'outcroppings,' 'fissure veins,' 'coarse lodes,' and 'deep levels,' and fortified by Skinner I could have a 'run' home, 'drive' up to the offices of one of the 'leading' financiers in the city, and take a 'rise' out of some of the 'country' bumpkins here. That the rich 'chute' had been discovered by 'Long Tom' or 'Black Jack' need matter little so long as the 'pockets' of the 'adventurer' were well filled. This comes of studying the dictionary."

BATTERY AND GOLD RETURNS.

HAURAKI GOLDFIELDS.

Battery Returns for October, 1897.

Name of Company, Mine, or Battery.	Locality of Mine.	Ore or Tailings.	Number of Tons crushed or treated.		Yield of Gold or Bullion.			Value.		
			Tons.	Lb	Oz.	dwt.	gr.	£	s.	d.
Waiotahi	Thames	Ore	120	..	141	1	0	382	12	0
May Queen Extended	„	„	79	..	95	6	0	..		
Kuranui-Caledonian	„	„	698	..	63	12	10	170	13	2
New Alburnia	„	„	200	..	95	10	0	..		
Claremont	„	„	..	12	10	1	0	..		
Hauraki Anchor	„	„	11½	..	6	7	0	..		
School of Mines	„	„	5	629	16	13	17	..		
Judd's Tailings Plant	„	Tailings	350	..	70	0	0	..		
New Zealand Crown Mines	Karangahake	Ore	1,788	..	2,024	3	0	4,068	17	3
Woodstock	„	„	1,015	..	2,970	6	0	2,765	1	2
New Zealand Talisman*	„	„	1,010	..	3,345	1	0	3,044	4	0
Waihi	Waihi	„	3,240	..	10,927	0	0	11,640	13	6
Waihi-Silverton Extended	„	„	1,104	..	820	0	0	1,615	0	0
Waitekauri	Waitekauri	„	2,095	..	4,236	0	0	4,512	5	9
Grace Darling	„	„	50	..	31	0	0	..		
Hauraki	Coromandel	„	350	354	617	14	0	..		
Hauraki North	„	„	78	20	62	9	0	..		
Kapanga	„	„	..	4	9	11	0	..		
Royal Oak	„	„	10	1,238	1,163	2	0	..		
Mariposa†	Kuaotunu	„	484	..	105	18	0	..		
Kapai-Vermont	„	„	360	..	222	0	0	..		

* 125 tons of tailings included in yield of bullion.

† 360 tons of tailings included in yield of bullion.

WEST COAST AND OTAGO GOLDFIELDS.

Battery Returns for October, 1897.

Name of Company, Mine, or Battery.	Locality of Mine.	Quartz. Tailings, or Cement.	Number of Tons crushed or treated.	Yield of Amalgam.			Yield of Retorted Gold.			Value.		
REEFTON AND LYELL.				Oz.	dwt.	gr.	Oz.	dwt.	gr.	£	s.	d.
Keep-it-Dark	Reefton	Quartz	362	250	0	0	74	4	12	..		
A1 Tributers	Lyell	„	10	51	0	0	21	15	0	..		
Alpine Extended	„	„	230	219	0	0	89	16	0	..		
J. Rodden and Party	„	„	20	107	0	0	20	6	0	..		
OTAGO.												
Achilles Goldfields	Bullendale	„	478	451	0	0	207	0	0	743	1	0
Glenrock Consolidated	Macetown	„	370	1,147	0	0	436	3	7	..		
Cromwell Tributers	Bendigo	„	500	..			1,080	3	6	..		
Morning Star *	Preservation Inlet	„	267	1,206	0	0	370	0	0	..		

* About three weeks' work, owing to alteration to battery. 40 oz. of amalgam not retorted when return was furnished.

OTAGO DREDGING RETURNS.

THE following returns for the month of October have been furnished by the secretary of the Dunedin Stockbrokers' Association :—

Name of Company or Dredge.	Locality of Operations	Yield of Gold.		
		Oz.	dwt.	gr.
Clyde	Clyde	125	0	0
Golden Gate	Island Block	120	8	0
Golden Run	Miller's Flat	163	0	0
Golden Treasure	Miller's Flat	85	14	0
Jutland Flat	Waipori	70	11	0
Upper Waipori	Waipori	36	19	0
Ettrick	Ettrick	30	10	0
Enterprise	Alexandra	110	10	1
Otago	Miller's Flat	38	10	0
Golden Crown	..	8	15	0
Dunedin	Roxburgh	4	0	0
Roxburgh Amalgamated *	Roxburgh	169	14	9
Molyneux Hydraulic *	Alexandra	132	7	8

* Sluicing claims.

Owing to the rise in the rivers, the returns are much smaller than for previous months. A number of the dredges do not publish returns.

The following dividends have been declared : Golden Gate, 7s. per share ; Golden Run, 1s. per share ; Otago, 6d. per share.

The flotation of the following dredging companies is announced : Vincent Gold-dredging Company (Limited), capital £5,500, in 5,500 shares of £1 each, 700 paid-up shares reserved for vendors ; Matau Gold-dredging Company (Limited), capital £7,000, in 7,000 shares of £1 each, 800 paid-up shares reserved for vendors ; Mount Ida Gold-dredging Company (Limited), capital £4,000, in 4,000 shares of £1 each, 500 shares reserved for vendors.

NEW COMPANIES.

NOTIFICATIONS of the formation of the following new companies have appeared in the *Gazette* from the 1st January to the 28th October, 1897. Particulars of companies in existence prior to that date will be found in the Annual Report on "The Goldfields of New Zealand," by Mr. George Wilson, Inspecting Engineer :—

Name of Company.	Place of Operations.	Number of Shares in Company.	Capital Value of each Share.		
			£	s.	d.
Kennedy (No Liability)	Kennedy's Bay	80,000	0	1	6
Hinemoa-Hauraki (No Liability)	Kuaotunu	100,000	0	1	6
Eaglehawk (No Liability)	Tararu	80,000	0	2	0
National (No Liability)	Kuaotunu	60,000	0	1	0
Rachel (No Liability)	Kennedy's Bay	60,000	0	1	0
Mangakino (No Liability)	Te Aroha	80,000	0	1	0
Monte Carlo (No Liability)	Kennedy's Bay	100,000	0	1	0
Silas (No Liability)	Puru	90,000	0	1	0
Wealthy Mint (No Liability)	Kennedy's Bay	90,000	0	1	0
New Year (No Liability)	Tairua	100,000	0	1	0
Grosvenor United (Limited)	Thames	23,750	0	2	6
Lioness (No Liability)	Karangahake	60,000	0	0	4
Great Maratoto (No Liability)	Maratoto	80,000	0	0	6
Komata Crown (No Liability)	Komata	80,000	0	1	0
Sceptre (No Liability)	Wharekiraupunga	100,000	0	1	0
Golden Centre (No Liability)	Puriri	100,000	0	1	0
Mount Taylor (Limited)	Thames	60,000	0	5	0
Capstan (No Liability)	Waitekauri	80,000	0	1	0
King of Omahu (No Liability)	Omahu	80,000	0	1	0
Alpine (No Liability)	Thames	72,000	0	1	0
Trojan (No Liability)	Puru	100,000	0	1	6
Opal (No Liability)	Tairua	70,000	0	1	0
Dover Castle (No Liability)	Puriri	80,000	0	1	0
Mount Lyell (No Liability)	Waihi	57,000	0	2	0
Salisbury (No Liability)	Mata Creek	100,000	0	1	0
Doris (No Liability)	Cabbage Bay	80,000	0	1	6
Daphne (No Liability)	Puru	60,000	0	1	0
Princess (No Liability)	Karangahake	50,000	0	1	0
Star of Tairua (No Liability)	Tairua	80,000	0	1	0
New Golden Point (No Liability)	Tapu	100,000	0	2	0
Turakina Gold-dredging (Limited)	Manuherikia	4,000	1	0	0
White Cliffs (No Liability)	Great Barrier	80,000	0	1	0
Nova Scotia (No Liability)	Wharekiraupunga	60,000	0	2	0
Maid of Erin (No Liability)	Waihi	50,000	0	2	0
Golden Falls (No Liability)	Whangamata	80,000	0	1	0
Dee Creek Gold-sluicing (No Liability)	Three-channel Flat, Inangahua	36,000	1	0	0
Golden Sand (No Liability)	Addison's Flat, Westport	100,000	0	2	0
Great Republic (No Liability)	Waimangaroa	50,000	0	4	0
Staffa (No Liability)	Great Barrier Island	100,000	0	1	0
Duke of Kent (No Liability)	Waihi	75,000	0	1	0
Kanui Extended (No Liability)	Paparoa Range, Greymouth	24,000	0	5	0
Inland Reefs (No Liability)	Te Aroha	100,000	0	1	0
Lord Rosebery (No Liability)	Maratoto	100,000	0	1	0
Wires (No Liability)	Whangamata	70,000	0	1	6
Ormond (No Liability)	Karangahake	70,000	0	2	0
Waikoromiko (No Liability)	Waikoromiko	80,000	0	1	0
Victoria Dredging (Limited)	Clyde	2,400	1	0	0
Parnassus (No Liability)	Wharekiraupunga	100,000	0	1	0
Boatman's Exploration (Limited)	Victoria Range, Inangahua	50,000	1	0	0
Port Jackson (No Liability)	Port Jackson, Cabbage Bay	150,000	0	1	0
Diamond (No Liability)	Waitekauri	60,000	0	0	6
Golden Valley (Limited)	Coromandel	150,000	1	0	0
Victoria (Limited)	Upper Blackball, Grey District	24,000	0	7	6
Alpine Extended (Limited)[1]	Lyell	50,000	0	10	0
Alpha (No Liability)	Preservation Inlet District	24,000	1	0	0
Golden Shore (No Liability)	Coromandel	100,000	0	2	0
Ruapaka Alluvial (Limited)[2]	Canvastown, Marlborough	10,000	0	3	0
Buller Dredges (Limited)[3]	Buller River, at Fern Flat	12,000	0	15	0
Garden Gully (No Liability)	Blackball and Moonlight	60,000	0	10	0
Dons (No Liability)	Tararu	100,000	0	0	6
Waiwhero Sluicing (No Liability)	Barrytown, Grey Valley	31,000	1	0	0
Caledonian[4]	Barewood	40,000	1	0	0
Roaring Meg Sluicing (Limited)[5]	Blackball, Grey Valley	100,000	0	2	0
Imperial (Limited)[6]	Upper Blackball	28,000	1	0	0
Flossie (No Liability)	Kennedy's Bay	60,000	0	0	8
Te Puke (No Liability)	Te Puke	100,000	0	0	6
Sunrise[7]	Preservation Inlet	30,000	0	10	0

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[1] 28,125 shares held in trust for the shareholders of the United Alpine Quartz-mining Company, and 15,459 for the shareholders of the Lyell Creek Extended Quartz-mining Company.

[2] 200 shares paid up.

[3] 5s. per share paid up.

[4] Shares to be deemed paid up to 10s.

[5] 50,000 paid-up shares issued in part payment of property sold to company.

[6] 4,000 shares held in reserve.

[7] 10,000 shares fully paid-up.

Increase of Capital.

An increase of capital in the Mata Reefs Gold-mining Company—75,000 new shares of 1s. each, paid up to ¾d., in addition to 125,000 shares already existing—is notified in *Gazette* of the 3rd June, 1897.

An increase of capital in the Fiery Cross Gold-mining Company (No Liability)—80,000 new shares of 1s. each—is notified in the *Gazette* of the 5th August, 1897.

An increase of capital in the Alpha Gold-mining Company—70,000 shares of 3s. each, in addition to the 50,000 shares already existing—is notified in *Gazette* of the 19th August, 1897.

An increase of capital in the Whau Gold-mining Company—25,000 new shares of 3s. each—is notified in the *Gazette* of the 23rd September, 1897.

An increase of capital in the Prince of Wales Gold-mining Company—70,000 new shares of 1s. each—is notified in the *Gazette* of the 23rd September, 1897.

An increase of capital in the Mount Waihi Gold-mining Company—60,000 new shares of 4s. each—is notified in the *Gazette* of the 30th September, 1897.

An increase of capital in the Waitekauri South Gold-mining Company—80,000 new shares at 4s. each—is notified in the *Gazette* of the 7th October, 1897.

DIVIDEND-PAYING MINES.

FROM the "Statement of Affairs of Mining Companies," published in the Government *Gazette* in accordance with the Mining Companies Acts, 1891 and 1894, the following tables have been compiled :—

Name of Company.	Locality.	Capital actually paid up.	Value of Gold or Bullion produced since Registration.	Total Amount of Dividends paid.
Hauraki Goldfields.				
		£	£	£
May Queen (Limited)	Thames	8,558	39,308	1,975
Cambria (Limited)	"	4,284	158,962	80,475
Waitaia (Limited)	"	1,325	2,010	1,392
Waihi (Limited)	Waihi	106,667	491,461	180,500
Waitekauri (Limited)	Waitekauri	100,000	33,261	7,150
Kapai-Vermont (Limited)	Coromandel	3,767	24,986	3,350
Try Fluke (Limited)*	"	2,775	57,087	55,470
Central†	..	1,050	..	2,908
Waiotahi (Limited)	Thames	15,000	159,616	33,750
Komata†	..	..	27,544	1,506
Nelson and Westland Goldfields.				
Keep-it-Dark (Limited)	Reefton	6,208	251,435	111,417
No. 2 South Keep-it-Dark (Limited)	"	10,900	23,839	8,600
Big River (Limited)	Big River	600	77,761	40,500
Golden Treasure Extended (Limited)	Reefton	5,234	4,217	900
Mont d'Or Gold-mining and Water-race (Limited)	Ross	10,800	74,068	24,600
Venture (Limited)	Addison's Flat	..	..	969
Johnstone's United (Limited)	Collingwood	12,409	..	1,916
Hercules (Limited)	Reefton	7,197	13,629	3,600
Cumberland (Limited)	"	6,298	45,758	13,800
United Alpine (Limited)	Lyell	28,853	242,697	74,267
Buller Gold-dredging (Limited)	Fern Flat, Buller River	600	8,645	1,800
Cock-sparrow Gold-dredging (Limited)	Buller River, near Lyell	1,050	7,474	525
Kumara Long Tunnel (Limited)	Kumara	7,433	..	5,019
Otago Goldfields.				
Enterprise Gold-dredging (Limited)	Alexandra	2,000	7,683	900
Jutland Flat Gold-dredging (Limited)	Waipori	4,000	19,122	4,125
Upper Waipori Alluvial Gold-dredging (Limited)	"	5,950	26,830	3,600
Roxburgh Amalgamated Mining and Sluicing (Limited)	Roxburgh	12,737	42,947	13,471
Ettrick Gold Steam-dredging (Limited)	Ettrick	1,937	11,478	1,687
Golden Gate Dredging (Limited)	Island Block	2,500	4,419	1,312
Golden Treasure Dredging (Limited)	Miller's Flat	1,384	11,526	2,948
Phœnix Water-race (Registered)	Tuapeka	1,500	..	5,850
Blue Spur and Gabriel's Consolidated (Limited)	Blue Spur and Gabriel's Gully, Tuapeka	30,000	87,127	11,659
Moonlight Sluicing (Limited)	Moke Creek, Queenstown	1,352	1,035	100
Sew Hoy Big Beach (Limited)	Shotover	8,775	80,377	16,138
Dunedin Gold-dredging (Limited)	Roxburgh	7,540	57,001	14,835
Otago Gold-dredging (Limited)	Miller's Flat	2,000	3,126	600
United Hercules Hydraulic Sluicing (Limited)	Roxburgh	5,252	28,332	8,400
Gallant Tipperary*	Macetown	6,100	17,848	1,500
Morning Star (Limited)	Preservation Inlet	2,575	14,475	3,212
Golden Site (Limited)	Wilson's River	6,615	4,436	750

* Sold to the Mariposa, an English company. † Not in active operation.

NOTE.—Several other dividend-paying mines have published their statements, but have not included total value of gold or amounts of dividends.

Coinage at the Melbourne Mint.

RETURN of the Quantity and Value of Gold received for Coinage at the Melbourne Branch of the Royal Mint, of the Gold Coin and Gold Bullion issued therefrom, and of the Revenue derived from Mint Charges, &c., from the opening of the Mint on the 12th June, 1872, to the 31st December, 1896.

Period.	Gold received for Coinage.		Issued.						Revenue.			Total Expenditure.	Net Cost to Victorian Government, including Repairs and Additions to Plant and Buildings.
			In Coin.			In Bullion.		Total Value of Coin and Bullion.					
	Gross Weight.	Value of Gold at £3 17s. 10½d. per ounce Standard.	Sovereigns.	Half-Sovereigns.	Total Value.	Quantity.	Value.		From Mint Charges on Gold.	From Sale of Silver and other Sources.	Total Revenue.		
	Oz.	£ s. d.	No.	No.	£ s. d.	Oz.	£ s d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1872*	190,765·43	765,023 12 5	748,180	...	748,180 0 0	1,312·690	4,027 19 5	752,207 19 5	2,655 19 11	1,289 6 6	3,945 6 5	13,767 0 7	9,821 14 2
1873	221,903·75	887,256 9 7	752,199	165,034	834,716 0 0	3,129·166	11,125 10 5	845,841 10 5	3,492 10 8	1,628 17 3	5,121 7 11	15,700 13 3	10,579 5 4
1874	335,365·83	1,349,289 12 5	1,373,298	...	1,373,298 0 0	2,911·722	10,416 10 0	1,383,714 10 0	4,861 14 9	1,692 17 10	6,554 12 7	15,198 7 1	8,643 14 6
1875	489,822·51	1,948,066 15 3	1,888,405	...	1,888,405 0 0	3,552·872	13,857 4 8	1,902,262 4 8	4,514 13 0	3,412 17 2	7,927 10 2	14,106 18 3	6,179 8 1
1876	543,303·70	2,149,890 3 3	2,124,445	...	2,124,445 0 0	3,624·578	14,144 10 1	2,138,589 10 1	3,960 12 4	4,192 12 5	8,153 4 9	12,895 13 8	4,742 8 11
1877	378,409·83	1,492,206 13 4	1,487,316	80,016	1,527,324 0 0	3,326·060	13,004 4 9	1,540,328 4 9	2,856 5 7	3,658 0 2	6,514 5 9	12,929 2 11	6,414 17 2
1878	570,078·76	2,268,001 6 2	2,171,457	...	2,171,457 0 0	3,691·003	14,640 4 10	2,186,097 4 10	3,929 3 3	4,643 2 1	8,572 5 4	13,650 7 5	5,078 2 1
1879	656,724·02	2,638,393 6 6	2,740,594	...	2,740,594 0 0	1,742·696	6,839 1 4	2,747,433 1 4	3,783 19 9	5,564 11 2	9,348 10 11	14,372 1 4	5,023 10 5
1880	758,937·15	3,062,662 12 8	3,053,454	...	3,053,454 0 0	1,860·986	7,219 5 10	3,060,673 5 10	4,346 14 0	5,928 3 3	10,274 17 3	14,655 17 6	4,381 0 3
1881	692,424·99	2,793,809 12 11	2,325,303	42,009	2,346,307 10 0	106,998·759	448,766 13 0	2,795,074 3 0	4,016 4 11	6,718 18 5	10,735 3 4	15,897 5 11	5,162 2 7
1882	819,142·55	3,311,893 15 3	2,465,781	107,522	2,519,542 0 0	189,837·253	789,686 17 11	3,309,228 17 11	4,856 1 8	5,521 19 5	10,378 1 1	15,148 2 8	4,770 1 7
1883	786,021·30	3,159,609 9 5	2,050,450	...	2,050,450 0 0	266,679·206	1,112,478 5 1	3,162,928 5 1	4,861 5 7	5,973 12 3	10,834 17 10	14,695 11 0	3,860 13 2
1884	945,709·48	3,803,320 3 1	2,942,630	48,009	2,966,634 10 0	200,766·424	835,728 8 9	3,802,361 18 9	5,742 6 5	6,751 7 3	12,493 13 8	15,387 6 0	2,893 12 4
1885	836,433·46	3,351,766 19 10	2,967,143	11,003	2,972,644 10 0	91,334·627	379,838 18 8	3,352,483 8 8	5,092 6 0	6,379 1 6	11,471 7 6	18,013 16 1	6,542 8 7
1886	756,610·71	3,029,783 1 5	2,902,131	38,008	2,921,135 0 0	25,700·855	107,719 6 4	3,028,854 6 4	4,799 12 3	6,540 6 2	11,339 18 5	16,125 14 0	4,785 15 7
1887	770,221·69	3,075,486 16 3	2,856,424	64,013	2,888,430 10 0	45,029·921	186,394 19 3	3,074,825 9 3	4,858 8 4	5,900 11 8	10,759 0 0	16,358 9 8	5,599 9 8
1888	757,812·75	3,023,414 0 0	2,830,612	...	2,830,612 0 0	46,611·313	194,218 15 4	3,024,830 15 4	4,703 16 2	5,263 2 8	9,966 18 10	15,521 19 9	5,555 0 11
1889	761,931·15	3,030,958 6 10	2,732,590	...	2,732,590 0 0	72,496·704	299,284 19 9	3,031,874 19 9	4,875 6 4	6,136 14 4	11,012 0 8	15,239 16 0	4,227 15 4
1890	752,922·82	3,003,635 7 5	2,473,537	...	2,473,537 0 0	126,430·480	527,143 13 3	3,000,680 13 3	4,796 0 9	6,875 12 3	11,671 13 0	14,955 17 4	3,284 4 4
1891	805,231·00	3,208,352 7 7	2,749,592	...	2,749,592 0 0	110,928·150	460,063 10 8	3,209,655 10 8	5,179 12 6	5,752 3 0	10,931 15 6	14,544 3 3	3,612 7 9
1892	880,052·25	3,491,756 10 6	3,488,750	...	3,488,750 0 0	1,317·730	5,183 11 8	3,493,933 11 8	5,762 5 5	6,389 11 7	12,151 17 0	14,864 0 4	2,712 3 4
1893	946,996·45	3,749,561 4 1	3,563,752	110,024	3,618,764 0 0	31,402·900	130,321 5 6	3,749,085 5 6	6,310 8 0	6,853 9 0	13,163 17 0	14,773 4 8	1,609 7 8
1894	1,061,523·45	4,172,714 13 1	4,166,874	...	4,166,874 0 0	1,165·760	4,606 0 8	4,171,480 0 8	7,534 16 3	7,455 8 1	14,990 4 4	15,198 5 10	208 1 6
1895	1,092,819·71	4,288,355 19 7	4,165,869	...	4,165,869 0 0	29,510·730	122,381 6 10	4,288,250 6 10	8,679 5 8	8,773 0 9	17,452 6 5	16,954 13 10	497 12 7†
1896	1,186,851·50	4,658,551 11 5	4,456,932	218,946	4,566,405 0 0	21,801·810	91,699 13 6	4,658,104 13 6	9,332 15 10	9,052 5 9	18,385 1 7	16,335 1 3	2,049 19 4†
Total ...	17,998,016·24	71,713,760 10 3	65,477,718	884,584	65,920,010 0 0	1,393,164·395	5,790,790 17 6	71,710,800 17 6	125,802 5 4	138,347 11 11	264,149 17 3	377,289 9 7	113,139 13 4

* From 12th June, the day the Mint opened to the public. † Profit.

ROBERT BARTON,
Deputy-Master.

Royal Mint, Melbourne, 3rd March, 1897.

MELBOURNE AND SYDNEY MINTS.

THE question of establishing a branch of the Royal Mint in New Zealand was under consideration so long ago as 1872, and has been lately revived. The following particulars with regard to the working of the branches of the Royal Mint at Melbourne and Sydney, which have been published, together with the regulations advertised in the Victoria and New South Wales Government Gazettes, will therefore be of interest to the mining community and the people of the colony generally. It will be observed, on referring to the table on the previous page, that the Melbourne Mint, for the first time since its establishment, shows a profit during the years 1895 and 1896.

Regulations for the Receipt and Coinage of Gold at the Melbourne Branch of the Royal Mint.

Gold can be deposited at the Mint in small or large parcels for coinage, subject to the following charges, allowances, and conditions :—

Charges.

(1.) For a deposit containing 1,000 oz. gross or over, 1½d. per ounce.

(2.) For a deposit containing less than 1,000 oz. gross, 2d. per ounce: provided that 4s. shall be the minimum charge for any one deposit.

The above charges will be made on the gross weight before melting in cases where silver is allowed for, and otherwise on the standard weight.

If a deposit contains more than 2 per cent. of base metal an extra charge, to be fixed by the Deputy-Master, will be made for its extraction.

Allowance.

Any silver in a deposit in excess of 8 per cent. of the weight of the deposit after melting will be allowed for at a rate per ounce fine, to be fixed periodically by the Deputy-Master.

Mode of Payment.

Deposits weighing in the aggregate 1,000 oz. or over will be paid for, if desired (in even thousands), in coin. The balance of coin payments and all other deposits by cheque.

Gold deposited on Monday and Tuesday will be made payable on the following Friday week, and on the following Tuesday week if deposited on Wednesday, Thursday, and Friday; but in case of lodgments (for which coin is desired) which contain any deposits of less than 1,000 oz. payment will be postponed to the pay-day following that on which they would otherwise be due.

Payment can be obtained for gold as soon as it is assayed and valued by paying a discount charge, to be fixed from time to time by the Deputy-Master, for the unexpired days.

N.B.—These arrangements respecting payments will be carried out as far as possible, but the Deputy-Master cannot be held responsible for their absolute performance in case of accident to the machinery, or should unusually heavy deposits be made on one day. In this latter case preference will be given to the earlier depositors.

Conditions.

(1.) Each parcel for which a separate assay is required shall be considered as a separate deposit: Provided always that the value of all deposits shall be determined on the report of the Assay Department of this branch of Her Majesty's Mint, which shall be final; and that the Deputy-Master may refuse any deposit which he may deem unsuitable for coinage; and that it shall be at his discretion to make exceptional arrangements in cases in which he may consider it desirable to do so for the advantage of the public service.

(2.) The receiving office at the Mint will be open daily for the receipt and issue of bullion from 10 a.m. to 3 p.m., except on Saturdays and holidays; but deposits made during the last ten days of each quarter will be received as for the following quarter.

Note.—Gold or silver bullion, in ingots or bars, can be obtained at the Mint to a limited extent—gold at £3 17s. 10½d. the ounce standard, and silver at such price as the Deputy-Master may think proper to accept. Not less than five pounds' worth of either metal will be sold at one time.

Gold coin which has become light after issue from the Royal Mint or its branches will be received at the Mint, in parcels of not less than £10 nominal value, at £3 17s. 10½d. per ounce.

These regulations to take effect on and from the 5th November, 1894.

Thomas Brisbane,
Acting Clerk of the Executive Council.

Legislative Assembly, New South Wales.—A Return showing the Gross Cost of the Sydney Branch of the Royal Mint to the 31st December, 1857, specifying the Cost of Buildings, Cost of Freight of Machinery, and every Expense incurred in bringing the Mint into Active Operation, including the Amounts paid for the Passages of the various Officers and Staff, and showing the Different Heads of Revenue under which such Expenditure has been charged.

	£	s.	d.	£	s.	d.
Cost of buildings ...	19,005	0	0			
Cost of machinery ...	14,413	19	3			
Cost of additional machinery subsequently provided	1,415	18	7			
Freight of machinery, &c.	1,790	14	3			
Passages of officers and staff	1,969	10	0			
Salaries, wages, and contingent expenses to the day of opening ...	10,394	18	9			
Total expense incurred in bringing the Mint into active operation	...			48,990	0	10
Expense of maintaining the Mint from the opening to 31st December, 1857 ...	36,520	13	5			
Less value of stores remaining unexpended on that date ...	1,592	3	10			
				34,928	9	7
Actual gross cost of the Mint to 31st December, 1857				£83,918	10	5

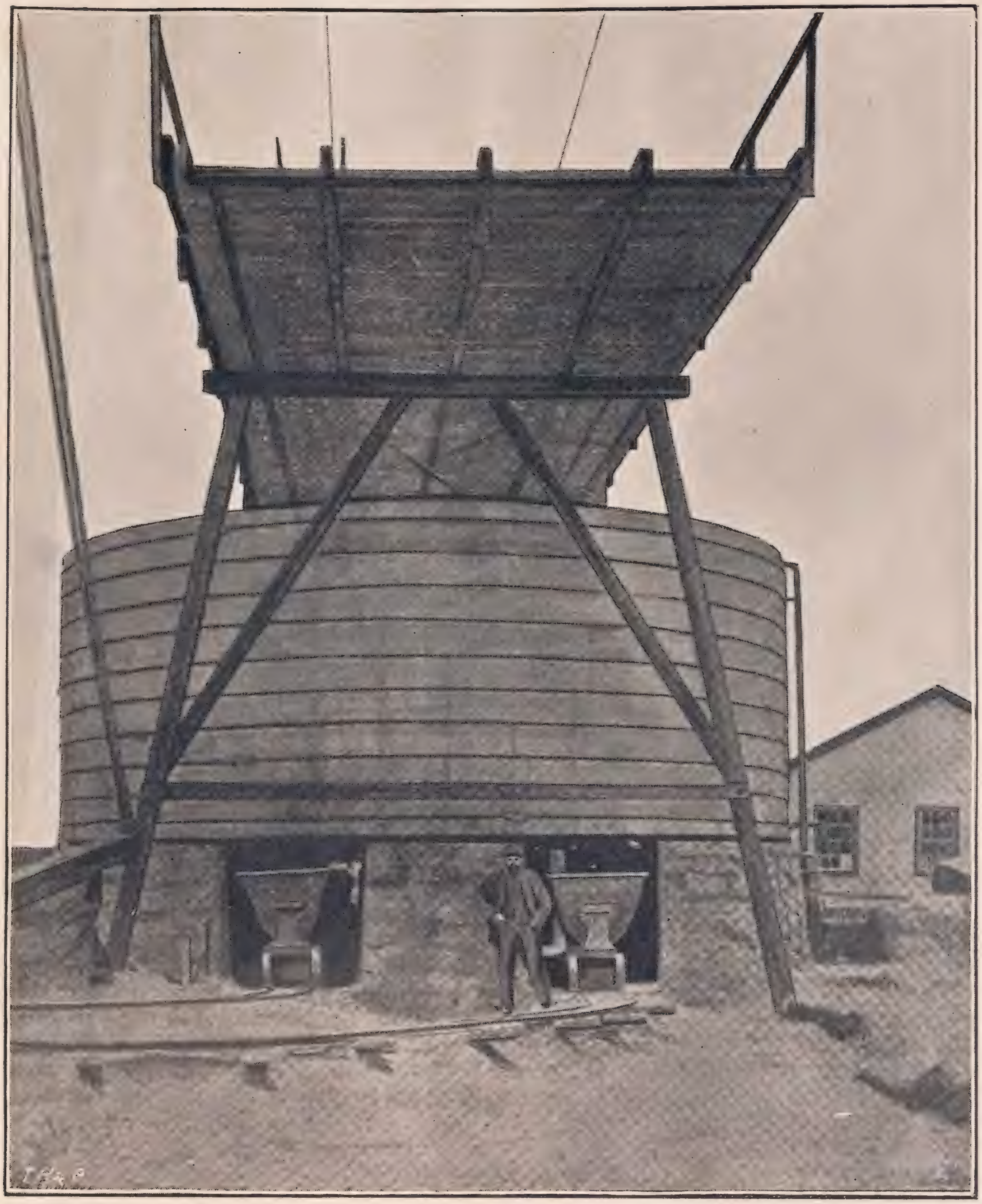

FIG. 16. End View of Cyaniding Vat.

The whole of the above sum has been voted on estimate, and charged to the general revenue of the colony, with the exception of £10,000 remitted to London in November, 1852, which was charged to the territorial revenue.

Regulations for the Receipt and Coinage of Gold at the Sydney Branch of the Royal Mint.

Colonial Secretary's Office, Sydney,
17th August, 1893.

His Excellency the Governor, with the advice of the Executive Council, has been pleased to frame the following Regulations for the Receipt and Coinage of Gold at the Sydney Branch of the Royal Mint, such regulations to take effect from the 17th instant, and to supersede all others previously in force.

1. Gold for coinage will be received at the Mint daily between the hours of 11 a.m. and 3 p.m., Saturdays and holidays excepted.

2. Each parcel of gold for which a separate assay is required will be treated as a separate deposit.

3. The value of each deposit will be determined upon the reports of the Mint assayers on its assay after melting, and computed on decimal assay reports—of gold to the $\frac{1}{2000}$ part, and of silver to the $\frac{1}{200}$ part.

4. The whole of the gold contained in a deposit will be accounted for at the rate of £3 17s. 10½d. the ounce standard, and all silver in excess of 2 per cent. at a rate to be notified from time to time in the *Gazette*.

5. The following will be the charges for melting, assaying, and coining, which will be deducted from the gross value of the deposit as above defined:—

(*a*.) On gold raised in New South Wales,—

(1.) In deposits of less than 500 oz. standard, at the rate of 6d. per ounce, 6s. being charged for a deposit under 12 oz.

(2.) In deposits of 500 oz. and over, but less than 5,000 oz. standard, at the rate of 4d. per ounce.

(3.) In deposits of 5,000 oz. standard, and over, at the rate of 2d. per ounce.

(*b*.) On gold certified to be the produce of any other country a reduction of 1d. per ounce in the above charges will be made, 5s. being charged for a deposit under 12 oz.

6. Gold received for coinage during the mint week ending each Monday will, under ordinary circumstances, be payable as follows:—

(1.) In deposits weighing less than 500 oz., on the following Monday.

(2.) In deposits weighing more than 500 oz. but less than 5,000 oz., on the following Thursday week.

(3.) In deposits weighing 5,000 oz. and over, on the following Monday week, or as early as the coining operations will permit.

7. When payment in gold coin is desired, notice must be given by the depositor at the time of lodgment, and it will be made in even thousands only. Complementary sums will be paid by cheque.

8. Deposits which may be found unsuitable for minting will either be returned to the depositor or be subjected to an extra charge for special treatment.

9. Gold and silver bullion, fine or standard, will, when practicable, be prepared for sale to the public, but no issue will be made of less than 5 oz. of gold or 50 oz. of silver. Gold will be charged for at the rate of £3 17s. 10½d. per ounce standard, and silver at such rate as the Deputy-Master may from time to time determine, and it will be at his option to demand payment in coin.

10. Light gold coin of the realm in parcels of £50 nominal value and upwards will be received for recoinage free of charge.

George R. Dibbs.

Royal Mint.

Chief Secretary's Office, Sydney,
17th September, 1896.

Referring to clause 4 of the Regulations for the Receipt and Coinage of Gold at the Sydney Branch of the Royal Mint, of date 17th August, 1893, it is hereby notified, for public information, that until further notice all fine silver in excess of 2 per cent. contained in deposits will be accounted for at the rate of 2s. per ounce fine. To take effect from the 1st proximo.

James N. Brunker.

THE CYANIDE PROCESS OF GOLD EXTRACTION.

(From the *Engineer*.)

II.

We ended, in the previous issue, with a description of the kind of wooden vat that is used for treating the auriferous "sand" with the dilute solution of cyanide, and noted at the conclusion that for the convenience of emptying the vats, doors are provided at or in the bottom, the latter position being the one usually adopted. A convenient and efficient form of this class of door—shown in Figs. 7 and 8 [in October issue]—is another introduction by Mr. Butters, although similar doors have been successfully used for other purposes. He directs a circular hole 16 in. in diameter to be cut in the bottom of the tank, upon which the flanged cylinder, which is of similar diameter and 7 in. high, is placed, whilst the cast ring having a turned face is placed below the hole; the ring and the flange of the cylinder are bolted together through the wood as shown. The tee bolt is then placed on the snugs cast for the purpose on the inside of the cylinder, and passes below through a hole in the centre of the cover, which is clamped up tight by means of the butterfly nut on the tee bolt. The cylinder is filled with waste sand, a slab of well-worked clay is pressed down over the top of it, and for convenience of access in large tanks, removable slotted cylinders in short lengths of 2 ft. are placed above half the doors to within about 6 ft. of the top of the tank. Each tank is, of course, provided with means for drawing off liquid below the filter bed and for supplying liquids at the surface. Both vats and tanks should be dressed smooth inside and treated with paraffin. Wooden foundations suffice for small tanks, but masonry is required for larger tanks; any way, the vats are directly supported on timber bearers running at right angles to the direction of the planks. The foundations must be so arranged as to allow trucks to pass below the discharging doors to carry away the tailings as they are shovelled out of the vat, and also to permit of the thorough inspection, &c., of the bottom of the vat. All these arrangements may be seen in the illustrations Figs. 12, 13, and 16.

When a sufficient quantity of material has been charged into the vat, which may take a day, day and half, or more, it is levelled, and the first cyanide solution of a strength of from $\frac{3}{10}$ to $\frac{7}{10}$ per cent. is run or pumped in; it may be run in from below, which, moreover, prevents the formation of channels. The amount of cyanide solution required, and the quantity of cyanide to be added to bring the solution up to required strength, are matters to be decided by simple quantitative tests and computations, in which the factors are:—Strength and quantity of the weak solution that is to be strengthened; strength of the strong cyanide to be used for strengthening; water already present in the sand to be treated. The solution of the required strength is either allowed to stand in contact with the mass twelve hours or so before running off from below the filter bed, or the solution is allowed to percolate steadily during the whole twenty-four hours of contact; sometimes it is caused to circulate by pumping it back to the surface as it is drawn away below; these are matters best decided on the spot to suit local circumstances. The strong solution is followed immediately by a weak solution, containing from $\frac{1}{20}$ to $\frac{3}{20}$ per cent. of cyanide, used in about the same quantity as the strong solution, or in quantities determined by experiment. The weak solution is followed by a rapid washing with water, which may be carried as far as is found expedient. The liquors from each treatment should be passed through a distinct set of precipitating boxes. It may be stated that the inclination is constantly tending to the use of more dilute solutions, even for the strong liquors, and in this direction it is interesting to draw attention here to some typical cases that we have had, with some other useful information, from Mr. Alfred James, of Glasgow. In one case as many as five washings are used, in another four; of both cases the particulars are as follows:—

	Weight of Solution used in proportion to weight of Charge.	Percentage strength of Solution.
First washing.. ..	$\frac{1}{3}$	$\frac{1}{20}$
Second ,, ...	$\frac{2}{15}$	$\frac{3}{20}$
Third ,, ...	$\frac{1}{5}$	$\frac{17}{50}$
Fourth ,, ...	$\frac{4}{15}$	$\frac{3}{20}$
Fifth ,, ...	$\frac{4}{5}$ or as much as possible	$\frac{1}{20}$
	Second Case.	
First washing.. ..	$\frac{5}{27}$	$\frac{1}{50}$
Second ,, ...	$\frac{16}{27}$	$\frac{1}{10}$
Third ,, ...	$\frac{5}{27}$	$\frac{1}{50}$
Fourth ,, ...	$\frac{4}{27}$ to $\frac{5}{27}$	$\frac{1}{100}$

In the first case the consumption is under ½ lb. of cyanide per ton of ore treated, whilst in the second case this important factor is reduced to about ¼ lb., and in neither case is wash water used, it being replaced by the weakest sump liquor; the usual consumption of cyanide being much above these quantities.

The auriferous solutions pass on to the zinc boxes, which are long trough-like constructions—Figs. 9, 10, 11 [in October issue]—of 1½ in. deals tongued and grooved with pieces 3 in. square along the top and bottom for the purpose of stiffening and of holding the necessary binding bolts; the box is divided into ten or a dozen compartments by partitions of 1 in. clear pine, whilst baffle boards gained and screwed to the sides extend from an inch or two above the top of and in front of the partitions, downwards to near the bottom of the compartments; the space between the bottom of the baffle board and the next partition is covered by a tray of iron wire gauze of about ⅛ in. mesh, on which rests the zinc in the form of very fine shavings; according to Mr. Christy, they should be long, tough, thin, light threads, fine enough to ignite readily, and tough enough to resist speedy disintegration to slime. The iron sieve is varnished before use. The boxes are built with a fall of 1 in 20, and so the solution traverses the compartments with facility, always passing upwards through the zinc. The first compartment contains no zinc, but serves for the settlement of suspended matter, and the last compartment is also free from zinc, but contains solid cyanides, so as to a certain extent restore the strength of the outflowing solutions before they pass to the sumps, where they remain until required for treating a fresh lot of ore. There should be a zinc box for each strength of solution, that is, one for solutions above $\frac{3}{20}$ per cent., one for solutions between $\frac{3}{20}$ and $\frac{1}{20}$ per cent., and one for weaker solutions and washings. The size of the compartments is regulated to hold about 1 cubic inch of zinc for every ton of ore treated per month; or for each ton, or 26 cubic feet, of solution to be precipitated per hour, 21 cubic feet are generally allowed in the zinc precipitating box, the rate of flow of solution being a ton per hour. The gold is deposited on the zinc, and as the latter gradually dissolves, the gold falls through to the space below the sieves, in which there are plugs, by lifting which the gold can be washed out and collected. Recently a trough with a locked cover has been fixed along one side of the trough, as shown in Fig. 15, for facilitating the collection of the gold. This is done when cleaning up; then, too, the gold attached to the zinc is also removed by washing and friction in water, the washed zinc being returned to the upper compartments, fresh zinc being placed in the lower ones. As regards the water carrying the gold slimes, it is passed through a 40-mesh sieve to remove coarse particles of zinc and allowed to settle; the gold is then collected and smelted, forming what is known as cyanide bullion.

It must be added that a cyanide plant must include reservoirs of sufficient capacity to hold the solutions—one for the strong, one for the weak. These are constructed in a manner similar to the cyaniding vats, but without filter beds or discharging door, and they are placed in such a position that the solutions may drain into them. It is well also to have a smaller reservoir situated at some higher level, of sufficient capacity to hold enough solution for one charge; in this the mixing to bring up to the desired strength may be effected. There should also be a high-level tank for dissolving the potassium cyanide and storing this stock solution. Then there must be sets of piping and launders for conveying liquids, pulp, sands, tailing; there must be separate systems of pipes for the various solutions and for water; 1 in. to 3 in. piping may be employed for the purpose; tee pieces and taps do for the connections with the various vats. Pumps are also required; centrifugal pumps serve the purpose well. A lathe for turning the zinc shavings is a necessary adjunct, unless the shavings can be readily purchased.

With regard to the arrangement of a cyanide works, it is best arranged with a small fall, so that tailings travel by gravity to the vats and solutions, flow of themselves to the precipitation boxes and the sumps; the leaching vats, too, are most conveniently arranged in a row, or

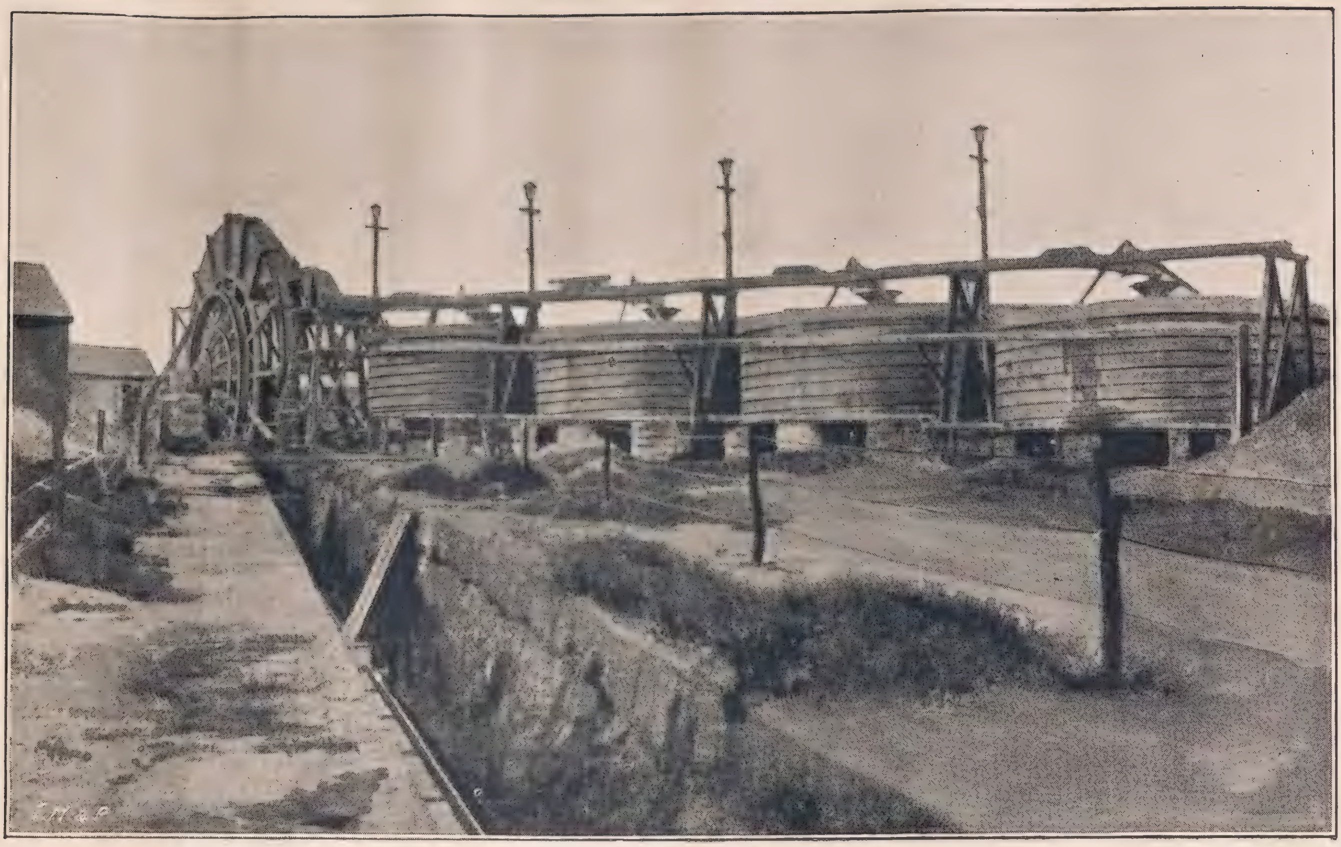

FIG. 12. Elevator Wheel and Settling Tanks.

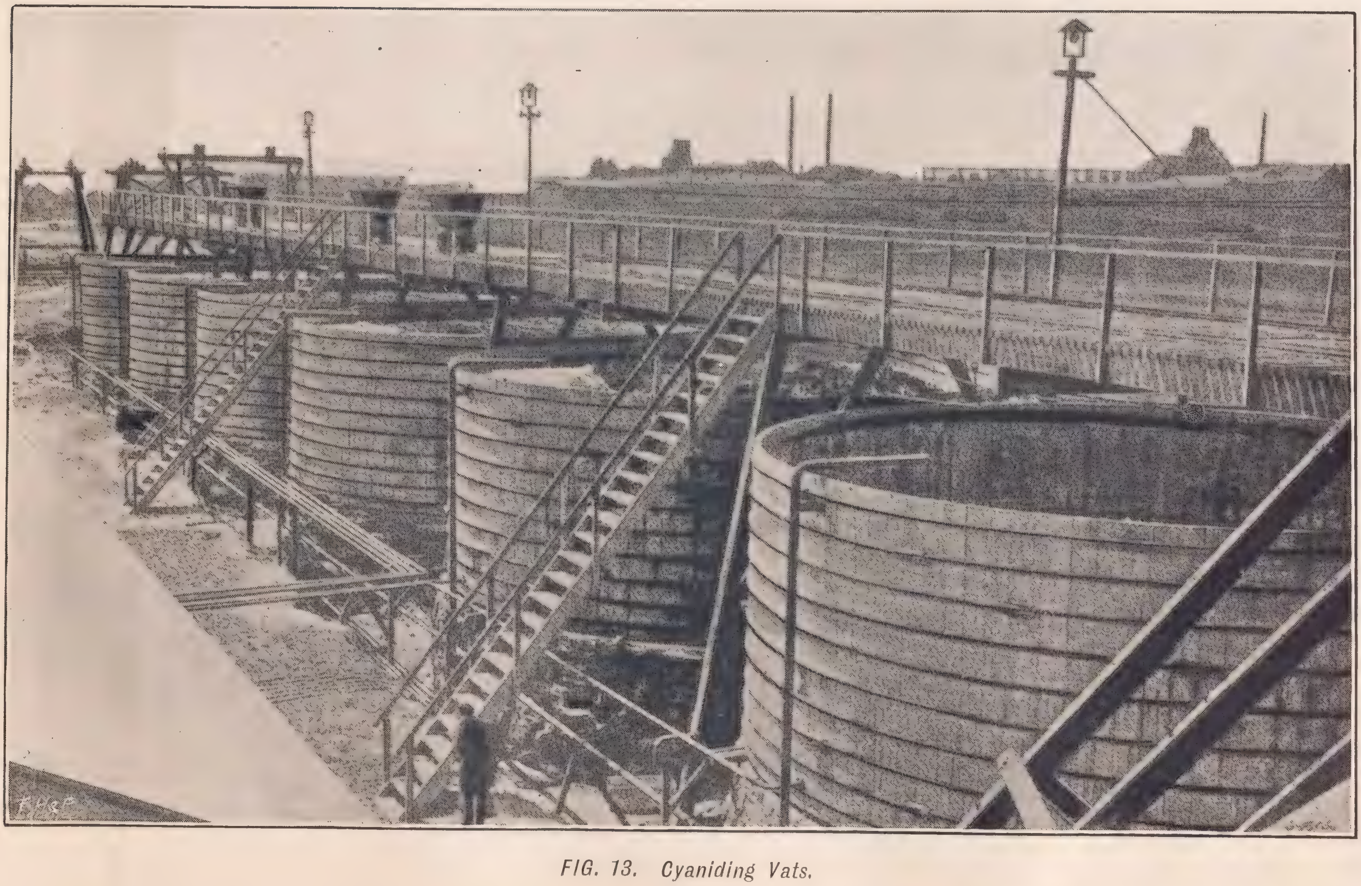

FIG. 13. Cyaniding Vats.

else near one another, so that the same set of pipes or launders serve for filling any one of them. Engines, pumps, zinc boxes, cyanide dissolving tank, &c., are best grouped together, so as to be under cover in one building, and the high-level solution reservoirs may conveniently be placed in the vicinity. The various points mentioned in this and the preceding paragraph are illustrated in Figs. 3, 13, and 14.

The amount of power required in this simple cyanide process is very small, and would be covered by three or four horse-power.

For the purpose of this article, Mr. C. A. Moreing, Messrs. Fraser and Chalmer, and Mr. William Thomas, of Camborne, have kindly furnished material for illustrations. Those furnished by Mr. Thomas—12 to 16—are of particular interest, as they not alone illustrate a new cyanide plant, but also give evidence of the good work being done at the Camborne Mining School in the way of supplying efficient mining men, and so keeping up the reputation of Cornwall for men, if not for mines. The manager of the mine, the works manager, and the taker of the photographs were all Camborne students. These illustrations represent the Ferreira New Cyanide Works at the mine of that name in the Transvaal. Fig. 12 shows the first portion of the plant, consisting of an elevator wheel for lifting the pulp to the launder and conveying it to the settling vats where the sand settles, whilst the slimes run off by means of rim overflow launder, and are conducted by troughs, shown, to settling dams for subsequent treatment; the settling vats are furnished, as may be seen, with the Butters and Mein distributor, are bottom discharge, with four doors in each tank, and each having a capacity for twenty-four hours' crushings in the mill. Fig. 13 is a view of the battery of extraction vats, with its system of pipes for applying liquors above and taking out solutions below, with its strong stone foundations underneath, and with the charging platform overhead, to which the sand is brought in tubs by a system of top endless rope haulage, and from the tubs falls direct into the vats. The vats are of the nature fully described above, being 30 ft. in diameter and 10 ft. high above the filter bed, with a capacity of 330 tons each; and the sections of the hoops are joined together by the castings already mentioned, which, too, are distinctly shown in the figure. Shaft frames and the surface works of a mine can be seen in the distance. Fig. 14 illustrates the precipitating house with the extraction vats behind, and the sumps in front; the latter are each of 80 tons capacity. Fig. 15 represents the precipitating boxes with charging hoses and cocks at one end, the outflow pipe at the other end, and the clean-up launders in front. Fig. 16 is an end view of an extraction vat, showing various details, including the arrangement of the top charging platforms, of the bottom discharge, and of the feed pump and pipes, at the side.

Experiments have been made in the Clausthal (Prussia) silver lead mines to reduce the consumption of explosives. The results obtained were satisfactory, inasmuch as, by using borers with a cutting edge of 1·4 in. instead of 1·7 in. to begin with, and 1 in. instead of 1·1 in. to finish with, a saving in dynamite of 16 per cent. was obtained.

IMPROVED MINING PROCESSES AND MACHINERY.

The increase in the number of applications for patents in connection with new or improved mining processes and machinery is very marked of late years. The following is a list of the complete and provisional specifications lodged with the Registrar of Patents in New Zealand from the 1st January to the 27th October, 1897:—

Complete Specifications relating to Applications for Letters Patent Accepted.

Improvement in making castings of stampers for quartz-crushing machinery.—John Barton, ironfounder, Hokitika.

Improved amalgamator for saving fine or float gold.—James Piercy, hotelkeeper, Kuaotunu.

Improvements in or relating to the separation of slime, gas, or other fluid from bodies containing or mingled with the same.—William Adolph Köneman, civil and mining engineer, London and Chicago.

Beere's loading-platform for aërial tramway systems.—Gerald B. Beere, civil and mining engineer, Thames, and Dennis G. MacDonnell, Auckland.

Improved combined amalgamating and concentrating apparatus. — Alexander Menesdorffey, miner, Robert William Jolly, wire-mattress maker, and John Wilson, furniture dealer, Victoria.

Improvements in and connected with the recovery of gold and other precious metals from cyanide solutions.—Emile Andreoli, journalist, London.

New or improved apparatus and process for amalgamating and extracting gold or other suitable metal from dry-crushed ore.—Emil L. Oppermann, electrical engineer, London.

Improvements in extracting gold from ores.—Carl Wichmann, London and Hamburg Gold-Recovery Company (Limited).

Improved process and apparatus for extracting gold from ore.—Henry R. Cassel and Bertrand C. Hinman, metallurgists, New York.

Improvements in or relating to the treatment of ores.—William A. Koneman, civil and mining engineer, and William H. Hartley, gentleman, London.

Self-generating motive-power machine and grinder.—James Piercy, miner, Kuaotunu.

Method and apparatus for treating the air in mines in order to control noxious gases.—John D. Williams, engineer, and Louis D. Gibson, bank manager, Creswick, Victoria.

Improvements in the treatment of sulphide ores of lead, preparatory to melting the same, and incidentally in obtaining sulphurous acid.—Thos. Huntington and Ferdinand Heberlain, metallurgical engineers, Pertusola, near Spezzia, Italy.

Improvements in the electric precipitation of gold and silver from their cyanide solutions.—Alfred James, mining and metallurgical engineer, Glasgow.

Method of extracting precious metals from their ores by means of solvents and electrolysis, and method for the manufacture of such solvents.—Charles A. Mulholland, science master, Bathurst, N.S.W., and Robert M. Cochrane, assayer and metallurgist, Kalgoorlie, W.A.

Improved stamper battery for pulverising ore in a dry state.—Marinus Weber, miner, Adelaide, S.A.

Improvements in ore-concentrating machines.—Owen Blacket, engineer, Sydney, N.S.W.

Improvements in extracting metals from their ores, or in obtaining solutions of same.—Frederick Wm. Streatfield, Fellow of the Institute of Chemistry, London.

Improved amalgamating apparatus.—Henry S. Cope, mining expert, Melbourne.

Improvements in stamper-batteries.—Robert Cockerell, blacksmith, Dunedin.

Improvements in the treatment of complex ores, mattes, and the like, and in furnaces therefor.—John Armstrong, consulting metallurgist, London.

Improvements in or relating to drilling- or boring-tools. — Bruno Wesselmann, engineer, Göttingen, Germany.

Improvements in apparatus for extracting precious metals by chlorination.—George F. Smith, electroplater, Sydney.

Improved apparatus for the treatment of sludge, tailings, or pulverised earths containing gold, silver, or other minerals.—Herbert R. Brookes, Charles G. W. Officer, and John Jones, mining and electrical engineers, Melbourne.

Improvements in compressed-air engines.—Lucius T. Gibbs, engineer, New York.

Improvements in and connected with means for securing cams and the like upon shafts. — Edward A. Blanton, jun., Pennsylvania.

Invention for screening auriferous wash-dirt or sand. —William Morton, engineer, Dunedin.

Improvements in dredges used for recovering gold.—Leslie H. Reynolds, civil engineer, Dunedin.

Improvements in the method of and apparatus for separating ores.—Walter T. Newman, expert in mines, Toronto, Canada.

Process for preventing or minimising the danger of explosions in mines.—William R. Townsend, messenger, G.P.O., Wellington.

Process for the treatment of sulphurous ores of complex composition.—Assignees of Michel Body, engineer, Brussels, Belgium.

Improved means applicable for use in the treatment of ores or compounds containing gold or silver, and in means applicable for use in the treatment of such materials with the aid of solvents.—John C. Montgomerie, J.P., Delamore, Stair, Scotland; and Henry Parkes, chemist, Dulwich, Surrey, England.

Treatment of sulphide ore for the separation of zinc from the lead and other metals.—Bernard Mohr, consulting chemist and metallurgist, Hampstead, Middlesex, England.

Improved amalgamating pan.—Edmund H. T. Plant, mine proprietor; and Samuel Dellow, mill manager, Charters Towers, Queensland.

Improvements in extracting metals from their ores, and apparatus therefor.—Mudios Syndicate (assignees of James J. Shedlock, metallurgical engineer), London.

Improvements in and relating to the recovery of gold and other precious metals. — Thomas G. Bowick, merchant, London.

Respirator for use in dry crushing and similar dusty operations.—Holroyd F. Way, miner, Thames.

Improved spiral ripple for gold-saving.—William B. Walters, engineer, Wellington.

Improvements in furnaces for the roasting of ores and other purposes.—Thomas Edwards, metallurgist, Ballarat, Victoria.

Improvements in diamond core-drills, in part applicable to other stone or like cutting-tools or machines.—Henry L. Webster, Klerksdorp, South Africa.

Improvements in apparatus or machines for shaping or forging and sharpening rock-drills and the like.—Stephen P. Quick, pitman, Johannesburg, South Africa.

Improved process for saving gold from refractory ores. —Frank White, silversmith, Christchurch.

An improved lubricator and wire-rope cleaner.—Ernest Wm. Lycett, Melbourne (assignee of W. H. Richards, engineer, Ballarat).

Improvements in the combined electrolytic and leaching treatment of zinc-bearing ores and zinc-bearing products. — Edgar A. Ashcroft, metallurgical engineer, Newcastle, N.S.W.

A new process for the treatment of gold and auriferous ores, entitled "Etard's Gold Dissolvent." — Alexandre Etard, chemist, engineer, and professor of sciences, Paris.

Improved method of and apparatus for charging smelting-furnaces. — Edward Hall, metallurgist, Stanthorpe, Queensland (nominee of Wm. L. Austin, metallurgist, Denver, Colorado).

Improved process for extracting gold from ores, minerals, and other gold-bearing substances. — James G. Black, professor of chemistry, Otago University, and Robert C. Skeet, merchant, Oamaru.

A new or improved apparatus for saving gold or quicksilver or amalgam.—Peter Johnstone and Wm. Bush, engineers, Gympie, Queensland.

Improvements in hydraulic giants. — John P. Simmons, San Francisco.

Improvements in rock- and like drills.—Sidney P. Blackmore, electrical engineer, Richard O. G. Drummond, electrical engineer, and Edward J. Way, general manager, Johannesburg, South Africa.

Improved manufacture of zinc shavings. — Peter Strang, engineer, Charters Towers, Queensland.

Improved pump for mining and other purposes.—George Lansell, quartz-miner, Bendigo, Victoria.

Improvements in the treatment of minerals for smelting and other purposes.—Robert F. Strong, civil engineer, London.

Improvements in machines for cutting and sharpening, and also for forging and sharpening, rock- and like drills. —Frederick G. Myers, Johannesburg.

Improvements in the treatment of complex sulphide ores, and apparatus therefor. — Francis Ellershausen, gentleman, Blackfriars, London.

APPLICATIONS FOR LETTERS PATENT, WITH PROVISIONAL SPECIFICATIONS, ACCEPTED.

Improved grinding and percussion amalgamating apparatus for auriferous tailings and earths.—Hiram Jones, engineer, and Robert Walker, gentleman, Victoria.

Chemical process for preparing ironsand for smelting. —Alexander Coubrough, engineer, Dunedin.

Improvements in or relating to the precipitation of precious metals from their cyanide solutions.—Martin Bernhard Zerener, metallurgist, London.

Improved gold-saving machine.—George Dunn, miner, and Jacques H. V. H. van Nooten, mining agent, Victoria.

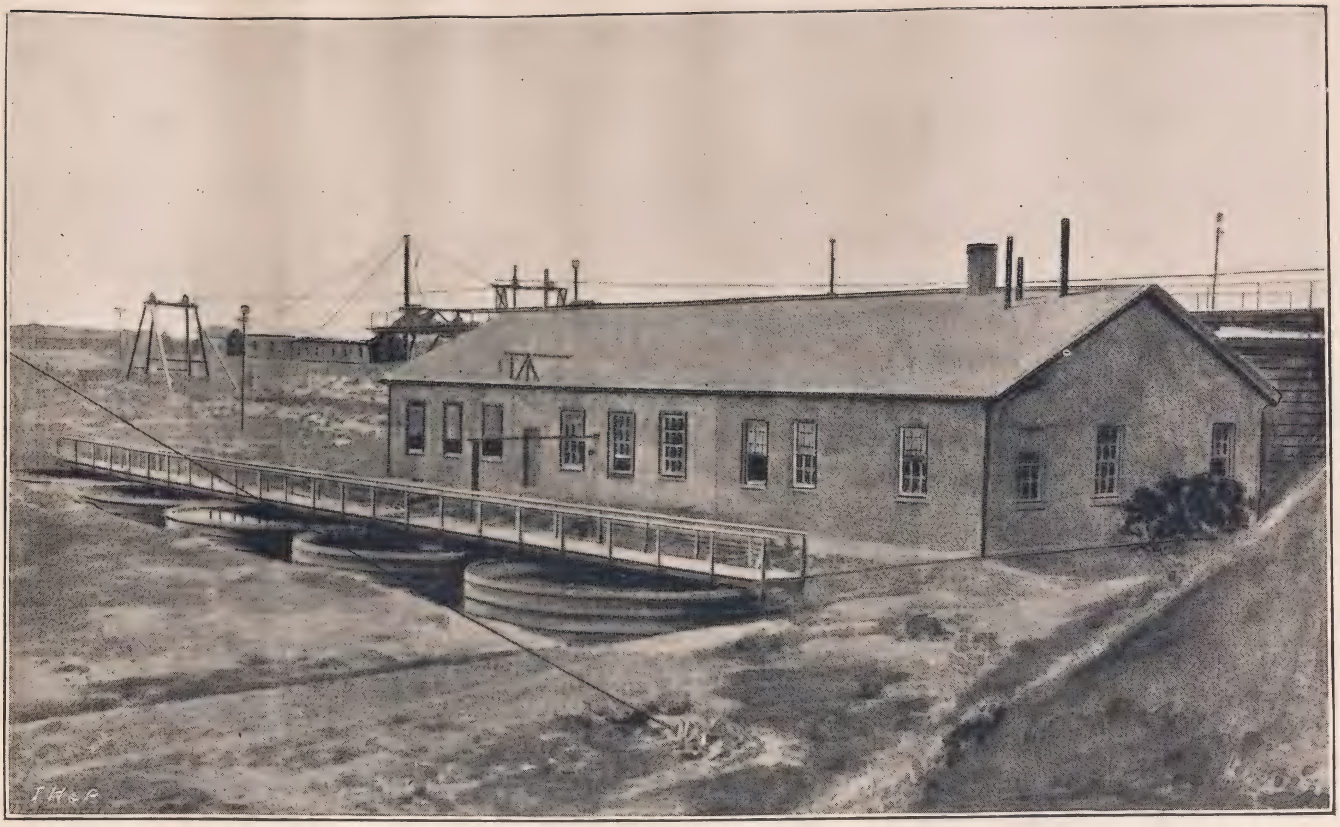

FIG. 14. Precipitation House and Sumps.

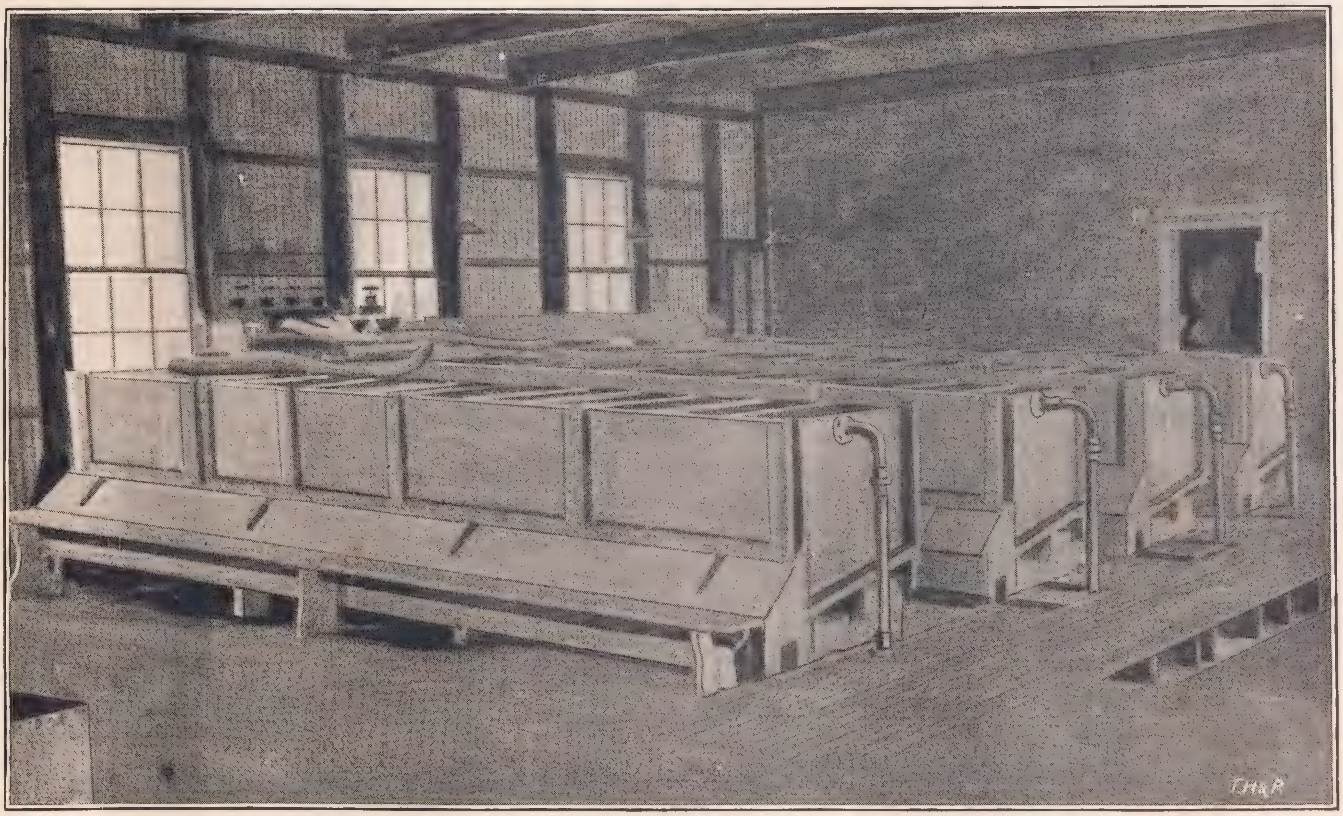

FIG. 15. Precipitating Boxes.

Improved process for the extraction of precious metals from their ores.—Silas Papprill, artisan, Ernest T. Watts, hairdresser, and Richard H. J. Reeves, M.L.C., Wellington.

Improvements in rock- and like drills.—Sidney P. Blackmore and Richard O. G. Drummond, electrical engineers; and Edward J. Way, general manager, Johannesburg, South Africa.

Improved method of saving gold in rivers and creeks. —Charles Wesley, Reefton.

Improvements in horizontal revolving ore-roasting furnaces.—Walter Sully, mine-owner, London.

Improvements in extracting precious metals from minerals containing them, and apparatus therefor.—Beda Becker, civil engineer, Eupen, Germany.

New process for the treatment of gold and auriferous ores, entitled "Etard's Gold Dissolvent."—Alexandre Etard, chemist, engineer, and professor of sciences, Paris.

Improved process and apparatus for preparing ironsand for smelting.—Alexander Coubrough, engineer, Wellington.

Improvements in the treatment of complex sulphide ores.—Francis Ellershausen, gentleman, London.

Improved process for extracting gold from ores, minerals, and other gold-bearing substances.—James G. Black, professor of chemistry, Otago University, and Robert C. Skeet, merchant, Oamaru.

Improved method of and apparatus for collecting and treating the dust of gold-bearing ores from stamper-boxes, under the dry-stamping process.—William H. Clarke, miner, Wellington.

New and improved construction of stamper-box.—Thomas Thompson, mining engineer, Coolgardie, W.A.

Improvements in machinery or apparatus for crushing and grading ores, quartz, and other materials.—James Wood, engineer, Plaistow, and William V. Clark, engineer, Stratford, England.

Improved lift-pump, principally adapted for use in mines.—Thomas Tregurtha, mining manager, Ballarat, Victoria.

Pneumatic feed- and dust-stopper for stamper batteries and the like.—William Thomas, farmer, Ngawaparua, Woodville.

New or improved process for recovering precious metals from metalliferous ore or sand.—Adolf Gutensohn, metallurgical chemist, London.

Improved centrifugal pump.—William Jennings, mine-manager, Beechworth, and Mathews G. B. Jefferson, legal manager, Melbourne, Victoria.

Improved pump, principally applicable for mining purposes. — John A. Wallace, M.L.C., mine-owner, Victoria.

Improvements in gold-saving tables for dredges and the like.—Charles H. Osmond, insurance manager, Dunedin.

Improvements in crushing-rolls.—John L. Kirkbride, settler, Wellington.

Improved process for extracting gold from ores, minerals, and other gold-bearing substances.—James G. Black, professor of chemistry, Dunedin, and Robert C. Skeet, merchant, Oamaru.

Improved amalgamator. — Edmund Lloyd Owen, mining and civil engineer, Ipswich, Queensland.

Improved gold-saving table.—Silas Papprill, inventor, Westport.

Improvements in stamps and stamper-dies for the reduction of ores in quartz-mills or batteries.—Henry H. Adams, mining engineer, Thames.

Improved system of and apparatus and appliances for ventilating mines.—Robert Schloesser, mining engineer, Melbourne.

Improved process and apparatus for extracting the liquid obtained by the treatment of metalliferous slime, pulp, or sand, with solvents.—Thomas T. Draper, electrician, and William Ryley, engineer, Melbourne.

Improved process and apparatus for extracting gold from battery tailings, sludges, and the like.—Francis B. Cronin, mechanic, Albert Park, Victoria.

Improved nozzle-fastener.—Young Wah, miner, Orepuki.

Improved safety-brake for cages used in shafts of mines, &c.—Theodore B. Jacobsen, architect, and Henry Rabe, mine-manager, Thames.

A contrivance by means of which men can work under water and seek for gold and other minerals, specially applicable to rivers.—Pierce Lanigan, contractor, Auckland.

Improvements in stamper batteries.—George Dunn, miner, Fitzroy, Victoria.

Improved electrolytic amalgamator, pulveriser, electrolytic precipitating-box, agitating and settling vats, and improvements in the process of and apparatus for extracting gold and silver from ores and other substances.—Peter Ferguson, mining engineer, Parnell, Auckland.

IMPORTANT MINING JUDGMENTS.

The Cyanide Patents.

IN connection with the cyanide patents and the matters concerning them, which have such great present importance for all those interested in mining enterprises, the judgment delivered on the 27th July last by Mr. Justice Mathew, in the Queen's Bench Division of the High Court of Justice, England, will be of interest. The plaintiffs were the African Gold-recovery (Limited), the holders of the MacArthur-Forrest patent rights for South Africa, and the defendants the Sheba Gold-mining Company (Limited).

The brief statement of the case is as follows: On the 2nd June, 1896, the defendants became licensees under the Transvaal cyanide patents of MacArthur and Forrest, agreeing to pay a 5-per-cent. royalty on all bullion extracted by the process, and to purchase cyanide from the patentees; but they claimed that the cancellation of the patents on the 4th November, 1896, by the Transvaal High Court relieved them of responsibility to continue the agreement. Joint admissions as follows were put in as evidence: (1.) The plaintiffs and the defendants are joint-stock companies, registered in England under the Companies' Acts, 1862 to 1890, having their registered offices in London, and carrying on business in the South African Republic. (2.) The defendants have, since the 2nd August, 1896, used the process referred to in the agreement sued upon, and have recovered bullion by means thereof. The defendants have refused to pay any royalty in respect of the bullion so recovered, or to furnish any accounts thereof since the account of the bullion produced in the month of August, 1896. The defendants have not, since the 2nd August, 1896, purchased from the plaintiffs any cyanide required for treating the tailings of the defendants. (3.) The plaintiffs were, until the 4th November, 1896, the holders of the South African Republic patents numbered 47 and 74, which patents were the patents referred to in the words "patented process" in the agreement of the 2nd August, 1896, and are the patents referred to by the High Court of the South African Republic in the judgment given on the 4th November, 1896, in the action entitled Hay *v.* The African Gold-recovery Company (Limited). (4.) The High Court of the South African Republic, by their said judgments, declared the said patents (Nos. 47 and 74) of the South African Republic to be invalid, and ordered the same to be cancelled.

The decision of Mr. Justice Mathew is as follows: In this case I am clearly of opinion that my judgment must be for the plaintiffs—that they are entitled to the declaration they ask for. The evidence before me is contained in the admissions which the parties have respectively made. The question turns on the construction of an agreement, entered into on the 2nd June, 1896, for the use of the process which the plaintiffs had patented. It is clear that that agreement followed others which had been entered into for similar purposes, and, at the time when the last agreement was entered into, proceedings had been commenced in South Africa to revoke the patent, it being a South African patent. Those proceedings were ultimately successful, but were not successful until the month of December, 1896. Meanwhile, from the date of this agreement, which is the 2nd June, 1896, the patented process had been used, and continued to be used, by the defendants. To that extent they had the full benefit of this agreement. Their answer to the present action is that the patent has been declared to be invalid by the Courts of South Africa, and has been ordered to be cancelled. Mr. Robson contended that the fact that the patent had been ordered to be cancelled gave his clients the right to defend this action. He admitted that, as a general rule, a licensee cannot dispute the validity of the patent, and that he is bound to pay royalties under the terms of his agreement. Notwithstanding that, the supposed patentee may admit that the patent is invalid; and Mr. Robson admitted that if the proceedings were taken by a third party, and in that litigation the patent was declared to be invalid, that would afford no defence to an action under an agreement of this description. He said this case goes beyond either of the cases which have been put, because here the patent has been ordered to be cancelled; and, laying hold of that word, Mr. Robson proceeded to apply the analogous case of landlord and tenant, and pointed out that, in numerous decisions, the case of patentee and licensee has been put on the same footing as the case of landlord and tenant—in each there is an estoppel of the same sort. You make an agreement, and are supposed to have looked round and contemplated the possibility of the termination of the patent. Nevertheless, you deliberately make an agreement to pay a certain royalty as long as the patented process is used. But, says Mr. Robson, take the case of landlord and tenant: it is clear that as long as the tenant remains in possession, though under a landlord who has no title, he is bound to pay rent; but the moment he is evicted he ceases to be liable to pay rent, and the estoppel is no longer binding on him; and here the analogy, Mr. Robson says, is complete. There is an eviction here, because this patent has been cancelled; but, unfortunately, when the point was reached where authority was wanted to establish the analogy between eviction and cancellation authority ceased. The principle, nevertheless, is perfectly clear, and the fact that the phrase "cancellation" is used in this judgment makes no defence. The case is the ordinary one of a licensee under a patent who is bound to adhere to the terms of his agreement as long as he uses the patented process; the analogy with evictions altogether fails, because there is nothing here to prohibit the use of this patented process. There is no declaration in law that the patent ought not to be used, and it is clear from the admissions that the process has been used, and has been continued to be used down to December, 1896. I therefore give judgment for the plaintiffs with costs, and, as a matter of form, I suppose the judgment will follow the claim.

It will therefore be seen that, notwithstanding the fact that the Transvaal patents have been cancelled, the companies which agreed to pay royalty, &c., must continue to do so as long as they use the process. As regards the companies who refused to become licensees, the cancellation of the patents has relieved them of all responsibility, and they may therefore use the process freely.

A Partnership Claim.

In the case of Ferris *v.* Carson and party, claim for £500 damages or a seventh share in the Lady Alice or Lady Mary leases, or that the company be wound up and partnership accounts adjusted, Mr. Warden Stratford delivered the following judgment at the Warden's Court, Westport:—

The history of this case may be summarised as follows: On the 22nd June, 1896, Messrs. Carson, Johnston, Williamson, Ballantine, and Ferris mutually agreed to mark off two special claims on the north side of the Mokihinui River, known thereafter as the Lady Mary and Lady Alice Special Claims. On the 22nd June Carson and Ferris commenced pegging the two claims by putting in two lower pegs, and, having by consent deputed Williamson and Johnston to finish marking off the same, these two persons (Carson and Ferris) proceeded to Seddonville and Westport with the object of borrowing the money to pay the necessary deposit and lodge their application for the two claims. There is no evidence to prove that Ferris and Carson acted otherwise than in a *boná fide* if not in a legal manner in the first place to carry out their instructions, and their evidence is equally reliable that Williamson and Johnston, in a *malâ fide* manner, wilfully neglected to mark off to completion the claims in question; that they, with evil intent, concealed their actions, and thereby deprived complainant of the opportunity he otherwise would have had of rectifying errors that had occurred, in my opinion, fatal to the granting of the claims upon the applications then lodged. Nothing that has been adduced can extenuate the conduct of Messrs. Williamson and Johnston, and, in a lesser degree, Carson, whose behaviour was reprehensible when he became acquainted with the wrong-doing towards Ferris that he did not expose and see justice done him, but rather, as accessory after the fact, concealed and joined in the conspiracy. But the law in this case is antagonistic with equity, and in my opinion will prevail, unfortunately, because the merits disclose that the complainant in equity is entitled to vindictive damages against Williamson, Johnston, and Carson. But on the law points raised I find—

(1.) That no partnership has been proved in the so-called special claims, Lady Mary and Lady Alice.

(2.) When Henry J. Ferris and Peter Carson, with Williamson, Johnston, and Ballantine, agreed to form together in a mining venture neither Ferris nor Carson had any *locus standi*, for neither had a miner's right; nor could they have entered into a mining partnership under the provisions of section 8, subsection (2), of "The Mining Act Amendment Act, 1893," even if they had had miners' rights, until they actually owned the special claims. These several persons named in the complaint, therefore, never became partners during the period covered by the complaint, because they never during that time possessed the special claims called Lady Mary and Lady Alice—in fact, they never applied for a special claim.

(3.) It is necessary that an application for a special claim should be signed by the applicant, and it is not an application until signed by him. On this point there is a decision by District Judge Ward, Cromwell Gold-mining Company *v.* Saxon and Arthur.

(4.) Even if Messrs. Carson and Ferris had signed the application on the 24th July, 1896, when they were lodged in the Warden's office, it could not have availed, as the recognised applicants were not qualified to mark off claims for themselves until after they had done so, they not being holders of miner's rights at the time, and also because the claims were, as a matter of fact, not marked off when the applications were lodged nor thereafter.

(5.) In ignorance of the law, but with good intentions, Mr. A. W. Mills, as agent for the parties, undertook to perform a duty, which he did in an illegal manner. He signed the applications for the claims, which act was fatal to their validity, and he signed the notice of withdrawal, which was simply waste paper. Carson for the Lady Alice and Ferris for the Lady Mary were the only persons whose notices could be entertained by the Warden, but as it happened—owing to the several reasons mentioned—the Warden had nothing before him on which he had any jurisdiction to entertain these so-called applications, and they were wiped out of the books by his certifying on one the word "Refused" and on the other "Withdrawn." As legal applications they never existed.

(6.) Therefore the land these applications were supposed to apply was Crown land, and open for application, when George Walker, with others, filed his application for the special claims, Hinemoa and Tama Hinemoa, and he cannot be entangled in any way with the disputes of these parties now before the Court; but it may not be out of place to mention that, had Williamson and Johnston acted straightforwardly with complainant Ferris, George Walker could not have become the possessor of the claims in the manner in which he did.

I find—(1) That no partnership has been proved between the complainant and defendants in the properties known as the Lady Mary and Lady Alice Special Claims, and that such so-called claims never existed; (2) that there was no agreement binding in law under the Mining Acts between the parties, and therefore no action could be maintained for breach thereof. The complaint would therefore be dismissed without prejudice, no costs being allowed to defendants.

Cancellation Suit.

At the Warden's Court, Riverton, Henry and George Cooper claimed the cancellation of an order of the Court, made on the 29th June, 1897, for the renewal of certificates of registration of license No. 1895, and also of said license, made in favour of W. McLean and H. E. Read. Mr. Warden Poynton delivered the following judgment:—

The defendant and another miner were some years ago the owners of a race, which was afterwards abandoned, and the water-right in connection with it was not renewed. A miner who had used the water of the race as tenant of the defendant and his partner applied for the race as an abandoned one, and it was granted to him. His application was made a long time after he had ceased using the water as tenant. He afterwards sold the race to the present holders. It has been used by them since the purchase. A short time ago the defendant, well knowing that the race was being used by the present owners to work their claim, got a friend to bring what is known as a friendly suit against him for neglecting to renew this water-right. He was fined a nominal sum, and the right was ordered to be renewed. This suit is one brought by the present owners to have that judgment or order set aside on the ground that it was obtained by misrepresentation. The defendant says he made an agreement with the before-mentioned tenant by which the tenant was to have the use of the water in consideration of his annually renewing the water-right, and that the tenant, instead of doing this, allowed it to lapse, and subsequently applied for it as an abandoned race. This is denied by the tenant, who was called as a witness. The application for the race made by tenant was duly advertised, as the partner of defendant could not be found, and everything that was necessary appears to have been done. Notice was not personally served upon the defendant. This was a matter for the Warden to consider, and he, no doubt, thought it was not necessary in view of the long abandonment. He thought the advertising of the application sufficient notice to both partners. The defendant must have known of the application. Even if he did not, he cannot now, years after having abandoned the race, take advantage of the omission to serve him personally to deprive the present owners of property they have acquired for valuable consideration, and which they have been constantly using. He clearly abandoned the race, and it was by a proper and open adjudication of the Court granted to another person. His concealment of these facts was a misrepresentation sufficient to make the order obtained by him for renewal void. Fraud vitiates all proceedings, and this was clearly a fraud on the rights of plaintiffs—an attempt to obtain by a technical process of the Court, without any notice either to the Court or the owners, the possession of valuable property. Miners must understand that the process known as a "friendly suit" is not to be used for the renewal of water-rights that have been abandoned. It can be resorted to only where the right which is being used has been inadvertently allowed to lapse, and the owner desires to save himself the trouble of making fresh applications; also to preserve a continuity and priority of his title. In all cases where the right has been abandoned fresh applications must be made, even by the original owners. Since the abandonment other rights may have been acquired which may be affected by the grant; and notice must be given to all persons whose rights may be interfered with. Such notice is not, of course, given in a friendly suit for renewal of rights. The present case is a glaring instance of how this useful procedure may be abused. The Court finds that the order for renewal of the right was obtained by misrepresentation and fraud, and declares it void and cancelled, with costs to plaintiff.

Applications for Dredging Claims.

In re an application by Alexander Patrick, for special claim on Section 33, Block I., Cromwell Survey District, Otago. Objected to by Roy and McGeorge, holders of the ground. The following judgment was delivered by Mr. Warden McCarthy:—

This is an application pursuant to sections 60 and 66, of "The Mining Act, 1891," for a special claim license in respect of Section 43, Block I., Cromwell Survey District, at present held by the objectors under a special claim license, for the purposes of mining for gold by means of dredging, which license, apart from the provisions of section 60, still remains uncancelled. The grant of the application is objected to on the following grounds—namely, "that the objectors (*a*) are the licensees named in the special claim above referred to; (*b*) have expended £5,000 on a dredge to place on the ground, the subject of the license, the completion of which dredge is detained on account of the engine for the same not having arrived in New Zealand in time; (*c*) are at present applying to the Minister for twelve months' protection for the section, which application has been approved by the Warden."

The facts are these: The objectors have two special claims, and are the applicants for a licensed holding, the lands the subject of which are all situate on the Kawarau River. One special claim has a dredge working on it. About this special claim there is no dispute. This dredge has cost £5,000. The special claim in dispute, Section 33, was granted by the Warden on the 21st March, 1896; finally approved by the Minister of Mines on the 6th April, 1896, and registered as on that day by the mining registrar under certificate No. 64,073. The term of the license is twenty-one years, calculated from the day on which the Minister gave his assent. No plant or machinery has ever been erected on Section 33, nor has there been anything in the shape of actual as distinguished from constructive work or occupation thereof, by or on behalf of the objectors from the date of the grant to the day of hearing in the month of June in the present year. Any work or occupation has been purely of a constructive character. Thus the objectors have, since April, 1896, been engaged in constructing a dredge on the land applied for by them as a licensed holding—this dredge being for use on Section 33. That dredge was, on the day of the hearing, nearing its completion, and will, when completed, have cost £5,000. The work of completing the dredge has been delayed partly through the firm of engineers to whom its construction was entrusted not being quite up to time, and partly through the objectors having sold to a mining company at the Upper Nevis an engine bought by them to drive the dredge. This sale necessitated the purchase, by the objectors, of another engine from England, which, however, at the date of the hearing, had arrived at Cromwell before it could be made use of. It cannot, therefore, be successfully contested that the sale of the first engine, to any appreciable extent, delayed the completion of the dredge; and it is not even suggested by the applicant that, apart from the sale of the first engine, the objectors have not observed reasonable diligence in the erection of their second dredge. The objectors caused to be placed on Section 33 a notice headed "Protected," stating, in effect, that the dredge then being erected on the land under application as a licensed holding was intended to work that section. This notice was, on several occasions, defaced with natural and artificial means, but was always replaced by the objectors, and was, presumably, erected to comply with regulations 209 and 214. It has been suggested that certain facts in connection with the land under application by the objectors as for a licensed holding may help to shed some light on the present application and the objections thereto. This land was originally applied for on the 7th February, 1896. This application was withdrawn on the 17th of of the same month, when another application was made for the same ground. The latter application was granted on the 13th March, 1896, and on the 24th August in the same year a license was issued by the Warden, the term being twenty-one years as from the latter date. The license was surrendered for cancellation on the 9th December, 1896, and the same was accordingly, on that date, cancelled by the Warden. On the same day there was made, on behalf of the objectors, another application for the same piece of ground with certain additional adjoining lands. On the 11th February, 1897, an application pursuant to section 38 of the amending Act of 1896 was made for the extension of time for the completion of survey. This application was granted by the Warden. On the 3rd May, 1897, there was made by the objectors a further application for a licensed holding in respect of the same ground as that included in the application of the 9th December, 1896. The application of the 9th December was not formally withdrawn before the making of that of the 3rd May. Owing to delays in the Survey Department in completing the survey, both the latter applications were, on the 10th June, formally withdrawn, the ground having been previously pegged out on the morning of that day, and immediately thereafter an application therefor was made to the Warden for a licensed holding. It is difficult to conceive the reason for the withdrawal of the applications of the 31st May, seeing that the preliminary hearing was set down for the 8th July, 1897, and consequently was, at the time of withdrawal, still undisposed of. Further, no period mentioned in section 38 of the amending Act of 1896 had expired. It may be that the objectors were somewhat puzzled by the many and conflicting provisions of "The Mining Act, 1891," and its several amendments, which would seem to bear a close family resemblance to the proverbial Chinese puzzle. However, the net result of these numerous applications and withdrawals is that the time within which *bonâ fide* mining operations had to be commenced was unduly extended. It may hereafter become matter for serious consideration whether, if this method of procedure is indefinitely prolonged, the Warden should not exercise his undoubted discretion in the direction of refusing any application which may actually come before him for final decision. That, however, is a matter which does not, in the present proceedings, present itself for decision, and, indeed, there would seem to be nothing in the several mining Acts and the regulations made thereunder to prevent the adoption of such tactics, objectionable from every point of view though they be. The real question in connection with this licensed holding application, which has a material bearing on the present application, is whether there is any duty cast on the applicant for a licensed holding before the granting thereof to engage in any *bonâ fide* mining operations on the ground the subject of that application, and the answer is that there is not. In the early part of the month of April, 1897, the objectors, pursuant to section 79 of the Act, made application to the Minister of Mines, through the Warden, for an extended period of protection in respect of the special claim in dispute. The application came on for hearing on the 22nd of the same month before the Warden, and was formally recommended to the Minister, who has delayed giving any decision pending the ultimate settlement of these proceedings. The applicant, on the 26th April, 1897, made an application for a special claim in respect of Section 33, and this application and the objections thereto are the basis of the present proceedings. The case for the applicant rests for all practical purposes on section 60 of the principal Act; and it is to be observed that there being, in respect of the land the subject of Mr. Patrick's application, a title outstanding in the name of the objectors, which, on the face of it and apart from the provisions of that section, still remains in force, the onus of proving the facts therein set out lies on the applicant. What, then, are the provisions of that section? Section 60 enacts that "Any special claim which shall be unoccupied and upon which there is no plant or machinery, and which has been unworked for a longer period than is allowed by the regulations for the district, or for the part thereof in which such special claim is situated, shall be deemed to be actually abandoned ground, and may, without any adjudication of forfeiture or abandonment, be taken up for any purpose under this Act, in accordance with the regulations, by any holder of a miner's right, and the rights of any previous occupant of such ground, notwithstanding the existence of any registration of title thereto, shall be deemed to have expired." It will thus be seen that the present applicant must, in order to succeed, prove three distinct facts—namely, (*a*) absence of machinery or plant from the ground; (*b*) absence of occupation; (*c*) absence of work. It was suggested on behalf of the objectors that there was another fact, implied from the very terms of section 60, necessary for the applicant to prove—that is, of an intention on the part of the objectors to abandon the ground within the meaning of the well-known case of *Mulcahy v. The Walhalla Gold-Mining Co.* I cannot accede to this contention. In the first place, assent to that contention would be to contravene the clear and unambiguous words of the section, which invert the mere proof of the three facts therein set out with all the attributes of an abandonment in fact, and, in the second place, the matter, as far as this portion of the Otago Mining District is concerned, is concluded by the decision in the application of Ross and party, objected to by the Enterprise Gold Mining Company, and this conclusion is strengthened by a perusal of section 149, wherein special provisions and procedure are set out to meet cases of abandonment in fact, pure and simple. Now, admittedly, there was no plant or machinery on the ground, and it therefore becomes material to enquire whether the special claim, the subject of these proceedings, has been for the requisite length of time unworked and unoccupied within the meaning of section 60. And here it may be remarked that the present case is distinguishable from the case of Ross and party and the Enterprise Company. In that case there was no suggestion that a dredge was anywhere in course of construction to work the claim, the subject of those proceedings. The company had confined its attention to making applications for protection, and it transpired that, although a meeting of the company had been called to take into consideration the advisability of building a dredge, yet its erection was purely problematical. It is further to be noted, it has been decided in this part of the Otago Mining District, in the case of Leijon and party and Spencer and others, that the policy of the Mining Act is not to favour "jumping," but to discountenance "shepherding." Before proceeding to determine the question now presented for solution, it becomes material to inquire what is, as a general review of all the provisions of the principal Act and its amendments, work and occupation respectively. Now, it is important to note in respect of these clauses of mining privileges coming under the denomination "claims," as that term is referred to in the Act from which, by interpretation, privileges like special claims, held under license, are excluded, constructive work and occupation are allowable. (See interpretation of the terms "claims," "mining operations," and "mining purposes," in section 4; also see sections 45 and 56, and Regulation 214.) In this connection it should, however, be observed that, from a perusal of these provisions, the reasonable inference is that this constructive work and occupation must not only be *bonâ fide*, but reasonably continuous. Here colourable devices will not suffice. It is in the light of the considerations suggested by a perusal of the sections and regulations just cited that we must interpret the term "mining operations," contained in subsection (3) of section 71, which is expressly made applicable to special claims; keeping, of course, also in mind the well-known rule that as in all cases where the language of the statute is not clear and unambiguous, the Courts will lean against granting a forfeiture. In my opinion, subsection (3) of section 71, read in conjunction with the other parts of the Act, recognises *bonâ fide* constructive working and occupation of special claims, which is also reasonably continuous, as being such work and occupation as will exclude the operation of section 60. And it is here to be observed that with respect to special claim licenses section 77 of the Act enacts that subject to the provisions in respect of forfeiture and to section 209, to which must by construction be added the provisions of section 60, "Every license to work a gold-mine issued under the Act shall give to the licensee for a term, not exceeding twenty-one years, an indefeasible right to all gold within the boundaries of the land therein comprised, and an indefeasible and exclusive right to dig and mine for gold therein and thereon, and to dispose of the same, to erect machinery on such land, and to construct works connected therewith, and to do all lawful acts incidental or conducive to the carrying out of these objects." If this section 71 read in conjunction with other parts of the Act recognises works *bonâ fide* carried on in connection with any special claim, though such works are not on the actual claim itself, as being a compliance with the statutory conditions imposed as licensees thereof, surely it ought to follow that the carrying on of such works should be held to protect such claims from the operation of section 60. It would, indeed, be strange if a compliance with those statutory conditions were not held to be an exemption from what is practically a decree of abandonment. It should, moreover, be borne in mind that section 60 stands on quite a different footing to the provisions relating to the forfeiture. In dealing with these provisions the question for determination is whether the licensee or grantee has done sufficient work, whilst under section 60 the question is whether any *bonâ fide* and continuous work at all had been done. Lastly, the possibility must not be lost sight of that there may be no place on a dredging claim which could be made suitable for building a dredge without the expenditure of a large sum of money, whereas some distance away there may be a spot which a comparatively trifling expenditure would render suitable. If therefore, by a reasonable construction of the whole Act, it is possible to lessen the cost of erecting machinery, such a construction should be adopted. Inasmuch, therefore, as there has been a *bonâ fide* and reasonably continuous constructive working and occupation of the special claim of the objectors for which application is made by the applicant, I must hold that the provisions of section 60 do not apply thereto. The objections raised by the objectors must, in consequence, be upheld and the application refused. No costs will be allowed.

In re an application by the Clyde Dredging Company (Limited). Objected to by James L. Scott.

The facts were as follows: The objector is the holder of a licensed holding over Section 25, Block I., Fraser District. The section had been under protection, but the protection had expired about six weeks before the applicant, in or about the month of July, 1897, pegged it out pursuant to section 60 of "The Mining Act, 1891." The license for the section was granted in the early part of the year 1896. Since the date of the grant the ground had never been occupied but by means of the applicant's pegs, nor had any work ever been done either on or in connection with the section; nor had there ever been any machinery or plant thereon. No proceedings had ever been taken for the forfeiture of the objector's license, which, apart from section 60, still remained in force. Section 25 is within the boundaries of the Otago Mining District, and no regulations have ever been made applying exclusively to that district. The only regulations in force in that district apply equally to the rest of the mining districts of the colony.

The following contentions were urged on behalf of the objector: (*a.*) That the occupation of the objector by means of his pegs was a sufficient occupation to satisfy the requirements of section 60. (*b.*) That in any grant that section could not apply in any mining district where there are no regulations in force applying exclusively to that district, or made especially therefor. (*c.*) That the objector's license still remained in force, and no proceedings had been taken for the forfeiture thereof.

The Warden decided as follows: (*a.*) That the occupation mentioned in section 60 is an occupation whereby something in the nature of *bonâ fide* and continous mining operations, either on the land or in connection therewith, are carried out by or on behalf of the licensee, and not a mere occupation by means of pegs. (*b.*) That the regulations made by the Governor, and having general application throughout the mining districts of the colony, are regulations for the Otago mining district within the meaning of section 60. (*c.*) That on the facts the section must be deemed to be abandoned ground; and there was, therefore, no necessity for instituting proceedings for forfeiture. The objections were disallowed, and the application granted.

This decision has been appealed against.

THE YUKON GOLDFIELDS.

THE following circular, received from the British Columbia Board of Trade, will be of interest to any intending emigrants to the Yukon Goldfields:—

British Columbia Board of Trade,
Board of Trade Buildings, Victoria, B.C.,
16th October, 1897.

SIR,—

As a practical contribution to the development of Imperial trade, the British Columbia Board of Trade desire to bring under the notice of the people of Australia, through the medium of Boards of Trades, Chambers of Commerce, and the Press, a few facts regarding the goldfields of the Canadian north-west territories. The enclosed circulars are sent you with the hope that you will feel sufficient interest in the subject-matter to hand them to newspapers of your city for publication.

We wish to point out,—

1. The Klondyke and the great Yukon Goldfields are in Canada. Some good locations have been discovered in the United States territory of Alaska, but those in Canadian territory being so much richer, the Alaskan camps have been almost wholly abandoned. The rush of this year has been wholly to Canadian territory, and so will be that of next year.
2. Duties, averaging 35 per cent., are collected upon all goods taken into the Yukon, unless they have been bought in Canada. Hence, the best place for prospectors and intending miners and all others to purchase their outfits and supplies is in the British Columbia coast cities.
3. All steamers going north to the Yukon Goldfields either start from Victoria, British Columbia, or stop at this city on the way, except some of those that take the long and uncertain route *viâ* Behring Sea. Persons leaving Australia for the Yukon should buy their tickets to Victoria, no matter whether they travel by the direct line of steamers or go by way of San Francisco. At Victoria they can purchase tickets on the steamers going north, and procure their outfit, including horses and dogs, when the latter are needed.
4. Goods purchased in Victoria, British Columbia, will not be subjected to any duties, and the prices are as low as elsewhere, and in some cases lower.
5. Victoria merchants have had great experience in outfitting for remote goldfields; many of the merchants have been miners themselves in the early days.

It is important that information of the above nature should be disseminated as widely as possible in order to counteract the misrepresentations sent out by the Press of the United States. It is persistently stated by those papers that no duties are charged upon goods imported into the Yukon from points outside of Canada; that the only places where goods can be purchased and passages north secured are the cities of the United States; and systematic efforts are being made to lead the public to believe that in point of fact the Yukon Goldfields are not in Canada at all, but in Alaska. This is not done by direct statement, but by constant reference to the mines as the Alaskan Goldfields. Hundreds of persons have already been misled by these misrepresentations, and have suffered heavy loss thereby, having in many cases been obliged to turn back after reaching the Yukon frontier, on account of not being able to pay the duties on their outfits. We hope you will aid us in correcting those erroneous impressions, and also in securing for Canadian cities the full benefit of the trade arising from the exploitation of the great Canadian Goldfields of the Yukon.

I am, &c.,

F. Elworthy, Secretary.

The Secretary, Board of Trade, Wellington, N.Z.

IMPROVED MINING PROCESSES.

Mr. Oscar C. Heiden's Method of Extracting Gold and Silver by Electro-chemical Action.

The gold-saving machine invented and patented by Mr. O. C. Heiden, of Wellington, an old Victorian quartz-miner, and who was formerly mine expert to the Tasmanian Government, has received further improvement by the patentee in the way of chemical-electro action.

Mr. Heiden states that he has lately, on the Auckland goldfields, carried out experiments with his method of treating the coated or encased gold in mineralised ores which resist the solvent agent of cyanide solution in the usual way of percolation. The result, gained from researches, shows that a very small percentage of cyanide of potassium in solution, combined with the electrolytic product from the saline and alkaline contained in or supplied to the ore-pulp, causes a complete decomposition of the elements forming the encasement of the gold in the ore by the electric action received from the dynamo. It is further noticeable that the gold dissolves in a much shorter ratio of time than when electric currents are not applied; the gold in the solution is instantly precipitated, and forms an amalgam in the electric negative bath of mercury. The different chemicals used, extending over a period of two years, include cyanide, bromine, iodine, permanganate of potassium, and sea-water; and to each trial of any of the above-mentioned chemicals has been added the electrolytic product of chlorine and sodium, according to the nature of the refractory ore treated.

The patentee has constructed a working model, in part of glass tubes, to enable observation of the gravitation action in the descending column of auriferous ore pulp, or beach-sand, on its passage through the horizontally-placed mercury chamber. The ascending column is of some height, and through this the ore-pulp rises before being discharged back into the working-tank, from which it is repeatedly pumped up and gravitated through the apparatus, until all the gold or silver is absorbed in the electrolysed-mercury chamber. The working-tank contains tubes which conduct compressed air to keep the pulp in a well-mixed state for the pumping action, and supply an extra amount of oxygen to the solution. The dynamo is used to develop the electro-chemical action in the crushed ore-pulp in its passage through the apparatus. By this operation the precious metal is electrolysed, cleansed, and converted into amalgam in the mercury chamber. To prevent flouring or sickening of the mercury, a separate chamber is constructed containing a strong alkaloid solution, placed in direct contact and balanced on the mercury, which by electrolytic methods decompose the saline solution in the chamber, and produce chlorine and sodium, which, by contact, destroy all deleterious metals in the electric-negative mercury bath and keep it in a high state of efficiency to amalgamate the precious metals. The working-tank contains a centrifugal pump, which supplies the gravitation columns with a constant flow of ore-pulp and solution. An archimedian screw and the presure of the contents in the descending column force the pulp through the mercury and up the ascending tube back to the tank, this continuing until the gold and silver has been absorbed by amalgamation, which takes from six to twenty hours. The pneumatic tubes conduct the compressed air to the bottom of the working-tank to keep the pulp in a fluent state, and assist in breaking up the encasement by its frictional action on the particles in the dissolving solution. The disintegration of the deleterious metals adhering to the gold is pushed forward by applying a further electrolysing process to the pulp in the working-tank by introducing insoluble termini connected with the dynamo.

When the machine is applied to work auriferous beach-sand the iron-sand is expelled in the same process by applying an inexpensive method of electro-magnets; and when the apparatus is at work on tailings or slimes, containing free gold even to the minutest atom, then the above-mentioned chemicals can be substituted for sea-water, which, in passing through the apparatus, get electrolysed by each return in the descending column, and in the working-tank the coarsest or finest gold is precipitated into the electrolytic bath of mercury. The decomposing chamber, as mentioned above, in order to produce a continuous flow of sodium and chlorine to keep the mercury in its superior form of potency for amalgamation, is likewise maintained when sea-water solution is used. The passage by gravitation of the ore and solution through the apparatus causes an interesting rhythmic pulsation. This is attained by the employment of well-balanced forces, and is beneficial for the amalgamation of the precious metals.

The whole process is as nearly as possible automatic; and the inventor claims that it is far more economical in working expenditure, and with better results, than the percolation and precipitation on zinc shavings. Mr. Heiden states that the principle of the electro-chemical gold-saving apparatus overcomes the drawbacks hitherto experienced in treating slimes successfully and economically, by applying a large percentage of liquid with a minimum of either cyanide, bromine, permanganate, or sea-water, according to the refractory character of the ore treated, or other suitable chemicals. The electrolysing action above described, in conjunction with the powerful operation produced in the decomposing chamber acting as an absorbing power in the mercury, will retain every particle of the precious metal, whether in its metallic state or in solution, in its passage through the electro-negative state of the mercury bath.

The Permanganate Gold-recovery Process.

THE permanganate gold-recovery process, which is attracting so much attention just now among the mining community, was again shown in operation yesterday, in the melting-room of the Colonial Bank Buildings. To all intents and purposes it is an improvement on the older methods of chlorination, and differs from them, and also from the cyanide process, in that it requires no special training or chemical knowledge in its application to suitable ores. In all previous processes of the same nature which have been generally adopted, the chlorine is applied to the ore in a gaseous state. The fumes arising from the vats have always been an objectionable feature, in some instances seriously affecting the health of the men employed. With the permanganate process there is no escape of the gas, and the liquid itself is perfectly harmless. The present process is, as we have mentioned, a modification of the Etard process, a discovery made by a French scientist of that name. The nature of the Etard discovery was submitted to Dr. Black, of the Otago University, who immediately recognised its value, and began a series of experiments to satisfy himself that in actual practice the process would accomplish what it promised in theory. The result was everything that could be desired, the only drawback being that whereas one of the ingredients—hydrochloric acid—is a chemical of little or no commercial value in Europe (where it is allowed to run to waste from the alkali works), in the colonies it has considerable value. To find a cheaper substitute for this acid was the problem Dr. Black set himself to solve. He found that sulphuric, a much cheaper acid, together with common salt in combination with permanganate of potash, would accomplish the work of gold-extraction equally as well as the Etard solution, and with greater rapidity. It is the Black modification of the Etard process which is now being shown to the public, but the patent rights of both inventions will be the property of the company now being formed to exploit the discovery. The ore upon which the process is shown in operation is from the celebrated Mount Morgan Mine, in Queensland, and is so refractory in its nature that it can only be treated successfully by chlorination. In addition to the ordinary sulphides which occur in most gold-ores obtained from any depth, the Mount Morgan ore contains sufficient copper to make the application of cyanide an impossibility. An extraction of 92 per cent. of the gold contents has been effected with the Black solution in fifteen hours by percolation, and in five hours by agitation. Trials made upon bulk samples of one of the most rebellious of Otago ores—the blanket concentrates from the Barewood field—gave extractions of 95 per cent. These concentrates contain both antimony and manganese as well as the usual iron and arsenical pyrites. It may be stated that this Barewood material had been previously treated twice by the cyanide process for a total extraction of 20 per cent., and that the percentage taken out by the Black process was not 95 per cent. of the original gold contents, but 95 per cent. of that left in after double cyanidation. The result of another important experimental trial, which will be learned with interest by many in Dunedin, is that the ores of the Monowai Mine at Waiomo, Thames, are amenable to treatment by this process, and negotiations have been entered into for its practical application at that mine. The experimental plant is in the capable hands of Mr. J. P. Smith, M.E., who is well qualified to explain the process and to demonstrate its value.—*Otago Daily Times*, 26th October.

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